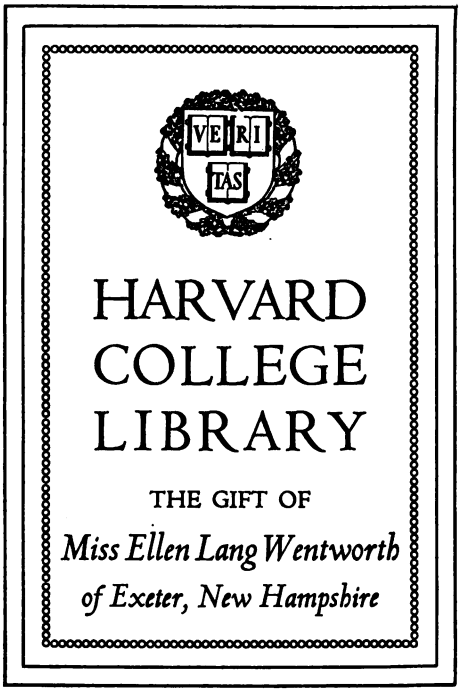

THE

FIRST STEPS IN NUMBER.

BY

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TEACHER'S EDITION.

PART II. — SECOND YEAR: NUMBERS TEN TO TWENTY INCLUSIVE.

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PREFACE.

THE object of this book is to provide teachers with a record of the work done in number in the primary schools of to-day.

There has been no attempt at novelty in the subject-matter, in the arrangement of work, or in the manner of presentation. The whole is on a constructive basis. Numbers are chief; processes subordinate. What has been found to be more easily understood precedes the more difficult, without respect to its scientific relation. Fractions present no greater difficulty than wholes, so they accompany the teaching of integral numbers from the beginning. The law of dependence has been carefully observed, although at first glance the arrangement may not seem to warrant this assertion.

The object of every teacher is so to present numbers that the mind of the child may grasp firmly the facts concerning them, and hold these facts tenaciously by the law of association. Success lies in requiring the child to *show* what he is talking about, and in following the "step by step" rule. The book illustrates these two principles. It abounds in examples which have not before appeared in print, and which are calculated to interest the child from their close connection with his varied experiences. It gives suggestions for versatility of drill, and illustrates in detail the teaching of a hundred topics.

It is expected that the work to the number ten will be taken in one year, the work to twenty in another year, and the remainder of the course outlined in the book will be covered in two years more.

A child's book accompanies this edition, which the child may use with great advantage after he becomes acquainted with figures.

It is hoped that this book will find a welcome among all persons interested in leading children by easy and sure paths to a knowledge of numbers.

G. A. WENTWORTH.
E. M. REED.

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PRIMARY ARITHMETIC.

Teacher's Edition.

PART II.

CHAPTER X.

THE NUMBER TEN. THE SIGNS: =, +, —.

§ 32. The Number Ten.

Place nine blocks on the table in front of you. Put one more block with them. Who knows how many blocks nine blocks and one block are?

Nine blocks and one block are ten blocks.

Nine splints and one splint are how many splints?

Nine horses and one horse are how many horses?

Nine balls and one balloon are how many toys?

Tell me a story for nine and one.

On one side of a building there is an opening left for the door, and nine openings left for windows. How many openings are on that side of the building?

One star shone out in the sky almost as soon as the sun was set, and soon I counted nine more stars. How many stars were to be seen then?

I saw an ant trying to carry off a big bug, but it was too heavy for him; and so another ant came to help him, and then another, and another, until at last nine other ants had come to help the first ant. How many ants were then carrying away the bug?

How many fingers and thumbs have you on both hands? If you had but one thumb, how many fingers and thumbs would you have on both hands together?

In a brood of ten chickens, one chicken was white and the rest were black. How many were black?

Make ten straight marks on the board. Cover nine of them with the eraser. How many marks are not covered?

Here is a ten-cent piece which you may take to buy three bananas at three cents each. How much money should you return to me?

If you buy a yard and a half of cambric at six cents a yard, and give a ten-cent piece in payment, how much money ought you to receive back?

I bought a bunch of envelopes for five cents, and two pencils at two cents each. I gave in payment a ten-cent piece. How much change ought I to receive?

I can ride ten miles on my ticket. If I ride six miles out and half way back, how many more miles can I ride on my ticket?

How many one-cent stamps can I buy for ten cents?

How many postal cards can I buy for ten cents?

How many sticks of candy can I buy for ten cents?

How many rolls of lozenges, at a cent a roll, can I buy for ten cents?

How many buns, at a cent a bun, can I buy for ten cents?

What will ten glass balls cost, at a cent a ball?

What will ten pens cost, at a cent a pen?

What will ten one-cent books cost?

If there is a mirror in each one of ten rooms in a house, how many mirrors are in the house?

An old clock-maker was very fond of buying old and curious clocks. He had one in each one of the ten rooms in his cottage. How many clocks had he?

How many ten-cent loaves of bread can be bought for ten cents?

How many sets of paper dolls, at ten cents a set, can be bought for ten cents?

How many picture-books, at ten cents each, can be bought for ten cents?

Notice how I express *ten* in figures.

What figure have I made? (The figure 1.)

What figure have I now placed against the 1? (The figure 0.)

These two figures show that ten is meant.

All raise right hands. Who will tell me on which side of 1 the 0 stands?

All write *ten* in figures, and think that the zero is on the right-hand side of the figure 1.

Write in figures what I show you with the blocks:

Nine and one are ten.
Ten minus one are nine.
Ten minus nine is one.
One and nine are ten.
Ten ones are ten.
Ten divided by one are ten.

The Sign =.

Who will supply the word that is needed to complete these sentences?

5 and 3	8.	7 minus 4	3.
9 and 1	10.	10 minus 1	9.
4 and 3	7.	9 minus 6	3.
3 threes	9.	9 minus 7	2.
4 twos	8.	10 divided by 1	10.
2 fours	8.	9 divided by 3	3.
10 ones	10.	8 divided by 4	2.

I will show you a new way to make the board say "are" in these sentences. This sign = stands for *are*.

Put this mark where it belongs in the first sentence, and read the sentence. In the second sentence, and read. In the next sentence, and read. Fill each blank, and read.

Complete these sentences:

5 minus 3 =	7 minus 3 =
3 and 2 =	7 minus 4 =
4 and 2 =	3 and 5 =
6 minus 4 =	4 and 5 =
2 and 5 =	8 minus 5 =
7 minus 5 =	9 minus 7 =
3 and 4 =	9 minus 5 =
9 minus 6 =	6 divided by 2 =
9 divided by 3 =	8 divided by 4 =
8 divided by 2 =	6 divided by 3 =
9 and 1 =	10 minus 1 =
1 and 9 =	10 minus 9 =

Show me eight fingers.

How many more fingers have you?

Eight fingers and two fingers are how many fingers?

Find if it is true that eight blocks and two blocks are ten blocks; that eight paper disks and two paper disks are ten paper disks.

Tell me stories for eight and two.

On my rosebush there are two roses and eight buds. How many buds and blossoms are on my bush?

In an excursion party there were two gentlemen and eight ladies. How many persons were in the party?

Eddie is two years old, and Frank is eight. If I give to each as many cents as he is years old, how many cents shall I give to both?

If I have ten cents to spend, and buy a whistle for two cents, how many cents shall I have left?

If there were ten cakes on the plate, and two were eaten, how many cakes were left on the plate?

I bought a pen-holder for ten cents, and Mary bought one for two cents less. How much did Mary pay?

Tell me a story for ten minus two.

There were ten lambs in a flock. Eight of them were white and the rest black. How many were black?

In an orchard there are ten rows of trees. Eight rows are young trees, and the other rows are old trees. How many rows of old trees are there?

Last week berries sold for ten cents a quart. This week they are selling for eight cents a quart. What is the difference in price?

Who has a story for ten minus eight.

Take ten blocks. Call them horses. Arrange them in spans. How many spans of horses are there? Call them oxen. How many yokes of oxen are there?

I have ten cents in two-cent pieces. How many two-cent pieces have I?

If a milliner uses two yards of ribbon for a pair of bonnet-strings, how many pairs of bonnet-strings will ten yards of ribbon make?

On a piece of road, stone posts were erected every two miles. How many posts would one pass in going ten miles on that road?

I have ten quarts of milk. How many two-quart cans can I fill?

Show me five rows of buttons, two buttons in each row. How many buttons do you show me?

If there are five birds, and each bird finds two worms, how many worms will they find together?

If there are five nests, and two birds in a nest, how many birds are there altogether?

I saw five street-cars go by with only the driver and conductor in each car. How many men were there on all the cars together?

Five bicycles have how many wheels?

In five dollars how many half-dollars?

Give an example for what I express on the board:

8 and 2 = 10.	10 minus 8 = 2.
2 and 8 = 10.	10 divided by 2 = 5.
10 minus 2 = 8.	5 twos = 10.

The Sign +.

Who will supply the word that is needed to complete these sentences?

8	2 = 10.	2	8 = 10.
5	4 = 9.	6	3 = 9.
5	3 = 8.	2	7 = 9.
4	3 = 7.	2	6 = 8.

Instead of writing the word "and," we can make a mark which always shows that *and* is meant. It is this, +. Who will describe this sign?

Put it in the first sentence, where you would put the word "and," and read the sentence.

Fill the space in each sentence with this sign. Read the expressions.

Finish these sentences:

2 + 4	5 + 4	2 + 7
5 + 2	4 + 2	3 + 5
4 + 3	3 + 4	6 + 3
7 + 2	8 + 2	2 + 8
2 + 4	3 + 6	2 + 5

Show me seven fingers; show me three more fingers. How many fingers have you shown me altogether?

It sometimes takes a week and three days to go across the ocean. How many days does it take?

In a class at school there were seven girls and three boys. How many children were there in the class?

I bought some dress goods for seven dollars, and trimmings for the dress for three dollars. How much did the material for the dress cost?

I have three days this week to visit, and all of next week. How many days have I to visit?

Three boys are playing tag and seven boys are playing ball. How many boys are playing?

In our little duck-pond there are three old ducks and seven ducklings. How many are there in all?

Who has a story for seven and three?

Who has a story for three and seven?

If I have seven cents and a three-cent piece, how many cents have I? If I give you the three-cent piece, how many cents shall I have?

If you have a three-cent piece and John has a ten-cent piece, how much more money has John than you?

There were ten chickens in one brood and three in another brood. How many more chickens were in one brood than in the other?

Charley had ten newspapers to sell. How many had he left after he had sold three?

There were ten lambs in a flock. Three lambs were sold. How many were there then in the flock? If seven lambs had been sold, how many would have been left in the flock?

A ten-quart can has seven quarts of milk in it. How much more milk will it hold?

I bought ten yards of cloth, and have used seven yards. How much cloth remains in the piece?

A man bought ten pounds of sugar, but seven pounds of the sugar spilled out on his way home. How many pounds had he when he reached home?

There were ten frosted cakes on the table at tea. After each of seven children had eaten one cake, how many cakes remained?

Who has a story for ten minus three?

Who has a story for ten minus seven?

If a bag of peanuts cost seven cents, how many bags of peanuts can be bought for ten cents, and how many cents will be left toward buying another bag?

How many quarts of berries, at eight cents a quart, can be bought for ten cents, and how many cents will be left?

How many dozen pens, at nine cents a dozen, can be bought for ten cents?

How many cents will be left after buying the dozen pens?

Take six blocks. Find how many more you must take to have ten blocks. Six blocks and four blocks are how many blocks?

There were six white pins on a cushion and four black pins. How many pins were on the cushion?

It is six miles to the foot of the mountain, and four miles farther to the lake. How far is it to the lake?

Two triangles and a square have how many sides altogether?

If you have two three-cent pieces and two two-cent pieces, how much money have you?

It will take a farmer a week and four days to finish haying. How many days will it take him to finish haying?

On our street are four elms and six maples. How many trees are on our street?

A lady painted four fans this week and six last week. How many fans has she painted altogether?

In a cottage there are four rooms upstairs and six rooms downstairs. How many rooms are in the cottage?

Who has a story for six and four?

Who has a story for four and six?

If there were ten persons at table, and four of these were children, how many grown persons were there at table?

There were ten little girls looking in at a shop window. Four of them went in to buy something. How many were then looking in at the window?

Jennie has ten words to write. How many will she have to write after writing four words?

I can see ten boats on the pond. Six of the boats have sails. How many are row-boats?

If you have ten weeks' vacation, and spend six weeks of your vacation in the country, how many weeks will remain in your vacation?

If a stake is ten inches long, and six inches are above ground, how many inches of the stake are in the ground?

Who has a story for ten minus four?

Who has a story for ten minus six?

Finish these expressions:

$6 + 4 =$	10 minus $4 =$
$4 + 6 =$	10 minus $6 =$
$4 + \quad = 10.$	10 minus $\quad = 4.$
$6 + \quad = 10.$	10 minus $\quad = 6.$

If an orange cost six cents, how many oranges can be bought for ten cents? How many cents will remain after buying the orange?

How many newspapers, at four cents a paper, can be bought for ten cents? What part of the cost of a paper will remain after buying the two papers?

How many fingers have you on each hand? How many have you on both hands?

This pansy has five petals and this pansy has five petals. How many petals have both pansies?

If there are five red morning-glories and five white ones on our vine, how many morning-glories are on our vine?

It is five miles to Chestnut Grove. If I go and return, how many miles do I travel?

Janey is five years old now. How old will she be five years from now?

I bought a book for five cents and a bottle of ink for five cents. How much did both cost?

Who has an example for five and five?

Make five straight lines on the board. Cross each of these lines. How many lines have you made all together?

Express on the board: $5 + 5 = 10$.

Make ten dots on the board. Erase five dots. How many dots remain?

Who has a story for ten minus five?

In a garden there were ten varieties of roses. During a severe winter five varieties died. How many varieties of roses were then in the garden?

A man who works ten hours a day works five hours before dinner. How many hours does he work after dinner?

If you have ten words to copy and copy five of them, how many words will remain to be copied?

John bought two toy shovels for a cent apiece, and a toy hammer for three cents. He gave a ten-cent piece in payment. How much money ought he to receive in change?

Harry earned six cents one week and four cents another week. He then spent five cents. How many cents had he left?

Mary visited her aunt a week and three days last summer, and it rained hard five days while she was there. If it was pleasant the rest of the time, how many days were pleasant?

One hen had two chickens and another hen had eight chickens. If five of these chickens died, how many chickens had the two hens together?

Express on the board: Ten minus five are five.

Here are ten blocks. See how many piles you can make if you put five in each pile.

If a boy sells apples at the rate of five for a cent, how many cents will he get for ten apples?

If a horse travels five miles an hour, in how many hours will he travel ten miles?

How many five-cent stamps can be bought for ten cents? how many five-cent pencils? how many dozen elastic bands at five cents a dozen?

Each think of a story for ten divided by five.

Write on the board: Ten divided by five are two.

Here are two piles of blocks with five blocks in each pile. How many blocks are here? how many fives?

Here are two strings of buttons with five buttons on each string. How many buttons are on both strings? how many fives?

Show me two hands. How many fingers on each hand? how many fingers on both hands? how many fives?

If you had five cents in each hand, how many cents would you have in both hands? how many fives?

Here are two boxes with five cents in each box. How many cents are in both boxes? how many fives?

I have two five-cent pieces. How many cents have I?

If I buy two five-cent books, what must I pay for both books?

If Ella uses five cents' worth of paper each day, how many cents' worth will she use in two days?

How many toes has a cat on two fore-feet?

How many toes has a dog on two feet?

How many petals have two apple-blossoms?

I have five dollars in my purse. I wish I had twice as much money in my purse. How many dollars do I wish I had in my purse?

If there are five desks in a row, and twice as many chairs as desks, how many chairs are there?

This strip of paper is five inches wide, and twice as long as it is wide. How long is this strip of paper?

I can walk five miles without feeling tired. Soon I hope to walk twice as far. How far will that be?

Two fives are how many?

Twice five are how many?

Write: 2 fives = ten.

Each take ten sticks. Show me one-half of the number of sticks you have. How many sticks do you show me?

If a man has ten cows, and sells half of what he has, how many cows does he sell?

If it is ten miles to Boston, how far is it half way there?

I can ride ten miles on my ticket. If I use half of my ticket, how many miles do I ride?

I divided ten pears equally between two boys. How many pears did I give to each?

I have ten cents. If I spend five cents, what part of my money do I spend?

Nettie had ten nuts. She gave me five. What part of her nuts did she give me?

Annie has ten paper dolls. Sarah has none. How many dolls must Annie give Sarah that each may have as many as the other?

Edwin has ten lozenges which he is going to give to John and Henry. If he gives to each the same number, how many will John have?

If a milliner puts ten yards of ribbon on two hats, so that there is just as much ribbon on one hat as on the other, how many yards does she put on each hat?

Who thinks of a story for one-half of ten?

What is one-half of ten?

Write: $\frac{1}{2}$ of 10 = 5.

The Sign —.

Who knows what word I have omitted in each of these expressions?

6	1 = 5.	6	3 = 3.
10	1 = 9.	4	2 = 2.
10	5 = 5.	2	1 = 1.
8	4 = 4.	7	1 = 6.

Read the first expression, supplying the word that is needed. (Let teacher make the sign — instead of writing the word.)

Read the second expression. (Let teacher make the sign —.)

Read the next expression; the next; the next. (Each time the expression is read, let the teacher make the minus sign. When the sign has been supplied in all expressions, have the expressions read again.)

Read what I have written:

10 — 6 = 4.	10 — 2 = 8.
10 — 7 = 3.	9 — 5 = 4.
10 — 8 = 2.	9 — 3 = 6.
10 — 4 = 6.	9 — 7 = 2.
10 — 3 = 7.	9 — 4 = 5.

Write:

Eight minus four are four.
Seven minus four are three.
Six minus four are two.
Nine minus four are five.
Ten minus four are six.
Ten minus seven are three.
Ten minus six are four.

Finish these statements that I have begun:

$10 - 4 =$	$8 - 3 =$
$10 - 6 =$	$8 - 5 =$
$10 - 1 =$	$7 - 5 =$
$10 - 5 =$	$7 - 2 =$
$7 - 3 =$	$8 - 7 =$
$7 - 4 =$	$9 - 7 =$

Exercise for Review.

There were ten little soldiers marching very straight. Two fell out of the line, and then how many were in line?

There were ten pins standing firm and even. I threw a ball and knocked down seven. How many were left standing?

We will call our fingers fairies. If three are ugly fairies, how many are good fairies?

Each of these fairies has a cap. If half have pink caps, and the rest black caps, how many have black caps?

Two of these fairies are clumsy and thick. How many are slender?

Each of the thick fairies has two joints. How many joints have both? Each of the others has three joints. How many joints have three of the others?

Each boy has two ears, two cheeks, two eyes, a forehead and a nose, a mouth and a chin. How many parts has each boy's head?

If each arm has a hand, a wrist, a forearm, an elbow, and an upper arm, how many parts has each arm? How many parts have both arms?

If each tooth has a crown, a neck, and a root, how many parts has each tooth? How many parts have two teeth?

A horse has one toe on each foot. How many more toes have you than a horse?

An ox has two toes on each foot. How many more toes have you than an ox? How many more toes has an ox than a horse?

An ox wears a shoe on each toe. How many more shoes does an ox wear than you?

A hen has four toes on each foot. How many toes has she on both feet?

If one bird has no teeth, how many teeth have ten birds?

Each feather has a stem and a vane. How many stems and vanes together have three feathers? have four feathers? have five feathers?

A squirrel has four toes on each fore-foot, and five toes on each hind-foot. How many toes has he on one fore-foot and one hind-foot. How many toes has he on his fore-feet? How many toes on his hind-feet?

A frog has four toes on each fore-foot, and five toes on each hind-foot. How many toes has a frog on one fore-foot and hind-foot together? How many toes has a frog on his hind-feet?

A grasshopper has three pairs of legs and two pairs of wings. How many legs and wings has a grasshopper, counted together?

If one insect has three eyes in his forehead, how many eyes will three such insects have in their foreheads?

If a hen has four eyelids to each eye, how many eyelids has a hen?

If a spider has four pairs of legs, how many legs has a spider?

Write on the board the figures that stand for the numbers I show you. (In this way test the child's knowledge of figures.)

Read what I show you with the blocks, then express what you read. (The sign for multiplication and the sign for division have not yet been given.)

Who has an example for what I have expressed on the board?

$6+4=10.$	9 divided by $3=3.$
$5+3=8.$	8 divided by $2=4.$
$7+3=10.$	10 divided by $5=2.$
$5+4=9.$	10 divided by $2=5.$
$9-6=3.$	2 fives $=10.$
$10-4=6.$	5 twos $=10.$
$10-7=3.$	10 zeros $=0.$
$10-6=4.$	$\frac{1}{2}$ of $10=5.$
$10-3=7.$	$\frac{1}{3}$ of $9=3.$
$10-8=2.$	$\frac{1}{4}$ of $8=2.$
$10-0=10.$	$\frac{1}{8}$ of $8=1.$

Use the proper signs where I have omitted them:

6	4	10.	10	7	3.
10	6	4.	10	0	10.
10	4	6.	10	10	0.
4	6	10.	10	3	7.

CHAPTER XI.

THE NUMBER ELEVEN.

§ 33. The Number Eleven.

Take ten splints. Make them into a little bundle, and put an elastic band about them. Take one more splint. How many splints have you in the bundle? How many splints besides? Tell me what you have. (Ten and one.) Who knows how many splints ten splints and one splint are?

Put back your eleven splints. Take eleven again the quickest way you can. (One ten and one.)

How many in the bundle? how many besides? One ten and one are how many? Write in words: One ten and one are eleven.

Who can express the number eleven in figures?

Who knows what the two ones mean?

Show me the *one* that stands for one ten. The *one* that stands for one.

Take nine blocks. Take two more blocks. How many blocks have you? Who has an example for nine and two?

I have three three-cent pieces, and a two-cent piece of money. How much money have I?

If I bought three three-cent stamps and a two-cent stamp, how much money did I spend?

If you buy three three-cent pencils and one two-cent pencil, how much money must you give for them?

If you have two cents, and earn nine more cents, how many cents will you then have?

There are two blossoms and nine buds on our night-blooming plant. How many buds and blossoms are on the plant?

There are two peach trees and nine pear trees in our garden. How many trees are in the garden? If the two peach trees die, how many trees will remain?

If you put back two of the eleven blocks you have shown me, how many blocks will you show me?

Represent eleven trees on the board, two of them lying on the ground. How many are standing?

Represent eleven chimneys. Two have no smoke coming out of them; the rest have. From how many chimneys is the smoke coming?

Represent eleven frogs, two on the edge of the pond, and the others in the pond. How many are in the pond?

Illustrate these stories:

Eleven blackbirds were flying in the air, but nine alighted on the ground.

Eleven clay balls were drying in the sun. Nine cracked in drying.

Eleven lamp-posts are on the street. Only nine have lamps on them.

I have eleven lead-pencils. Nine of them are sharpened, and the rest are not.

Eleven umbrellas stood in a shop window. Nine were shut and the rest were open.

Write on the board:

Nine and two are eleven.
Two and nine are eleven.
Eleven minus two are nine.
Eleven minus nine are two.
Ten and one are eleven.

Complete these expressions:

9 + 2 =	10 1 11.
11 − 2 =	11 − = 10.
2 + 9 =	11 0 11.
11 − 9 =	11 − = 9.
11 − 10 =	11 ones =
11 zeros =	11 divided by 1 =
9 + = 11.	9 2 11.
11 − = 9.	11 2 9.
2 + = 11.	2 9 11.
11 − = 2.	11 9 2.

There were eight tin pans and three milk-pails on a bench drying in the sun. Show me, with the splints, how many things were on the bench.

Eight hens and three worms are how many things?

Eight men and three boys are how many persons?

Eight chickens and three ducks are how many fowls?

Eight sky-rockets and three flying pigs are how many pieces of fireworks?

Tell me about eight bunches of grapes and three bunches of grapes; eight pears and three pears; eight great apples you saw at the fair and three small apples; eight red balloons and three blue balloons.

If you spent four two-cent pieces and a three-cent piece for molasses candy, how much did you spend?

How many legs have two dogs, and a stool with three legs?

If a blacksmith shoes two horses entirely round, and puts three shoes on another horse, how many shoes does he use?

If I have four pairs of shoes, and three odd shoes, how many shoes have I?

I have a five-cent piece of money, a three-cent piece, and three one-cent pieces. How much money have I?

There are three boys and eight girls in the first class, and eight boys and three girls in the second class. Which is the larger class?

Mr. Brown has eight cows and three horses. Mr. Smith has three cows and eight horses. Which has the more animals?

Which costs the more: some candy for three cents and a pencil for eight cents, or some candy for eight cents and a pencil for three cents?

If I have four two-cent pieces of money and a three-cent piece, and spend the three-cent piece, how much money shall I have left?

If eleven dor-bugs should come in at my window, and three should alight on my table, how many more dor-bugs would still be flying about the room?

If eleven ants were carrying away a great beetle, and three got tired and ran away, how many ants were left to carry the beetle?

If eleven flies were sipping at a drop of molasses, and three flew away, how many flies were there sipping at the molasses?

Make some drawing on the board to show me that eleven minus three are eight.

Does any one know what eleven minus *eight* are?

Who has a story for eleven less eight?

If eleven nuts minus eight nuts leave three nuts, what will be left if three nuts are taken from eleven nuts?

If eleven blocks minus three blocks leave eight blocks, what number will eleven minus eight leave?

Write: Eight and three are eleven.
Eleven minus three are eight.
Eleven minus eight are three.

Complete these expressions:

$11 - 3 =$		11	3 8.
$8 + 3 =$		8	3 11.
$11 - 8 =$		11	8 3.
$3 + 8 =$		3	8 11.
$9 + 2 =$		9	2 11.
$11 - 2 =$		11	2 9.
$2 + 9 =$		2	9 11.
$11 - 9 =$		11	9 2.
$11 - \quad = 8.$		$9 + \quad = 11.$	
$8 + \quad = 11.$		$11 - \quad = 9.$	
$11 - \quad = 3.$		$2 + \quad = 11.$	
$3 + \quad = 11.$		$11 - \quad = 2.$	

Nellie, stand seven spools in a row. Put four more spools with them. How many spools are now in the row?

Frank, set out seven tin plates; set out four more. How many tin plates have you set out altogether?

Seven horses and four sheep are how many animals?

A pound of flour at seven cents, and a pound of meal at four cents, will cost how much?

The cook made seven loaves of bread and four loaves of cake. How many loaves of bread and cake together did she make?

A week and four days are how many days?

A five-cent piece, a two-cent piece, and four cents are how many cents?

During three weeks, Annie went to school one whole week, two days another week, and four days the other week. How many days did she go to school during the three weeks?

If seven and four are eleven, four and seven are how many?

Which are more chickens: seven black chickens and four white ones, or four black chickens and seven white ones? seven gray rabbits and four white rabbits, or four gray rabbits and seven white ones? seven blue ribbons and four red ribbons, or four blue ribbons and seven red ones?

Who has a story for seven and four, or for four and seven?

If seven and four are eleven, who thinks how many eleven minus four will leave? See if you are right.

Eleven chairs minus four chairs are how many chairs?

Eleven oranges minus four oranges are how many oranges?

Eleven cents minus two two-cent pieces are how many cents?

Eleven days minus four days will leave what part of a week?

Eleven weeks minus a month will leave how many weeks?

Eleven months minus four months will leave how many months?

Eleven gills of milk minus a pint of milk will leave how many gills of milk? how many pints of milk?

If eleven blocks minus four blocks leave seven blocks, who thinks how many blocks would remain if I took *seven* blocks from eleven blocks. See if you are right. Who has an example for eleven minus seven?

There are eleven more days in this month. How many days over a week are there left in the month?

If there are eleven gills of water in this pail, and I dip out seven gills of water, what part of a pint will remain in the pail?

If I owe you eleven cents, and pay you seven cents, then give you the rest in two-cent pieces, how many two-cent pieces shall I give you?

Express: Seven and four are eleven.
Four and seven are eleven.
Eleven minus four are seven.
Eleven minus seven are four.

Fill out these expressions:

$7 + 4 =$	7	4	11.
$11 - 7 =$	11	7	4.
$11 - 4 =$	11	4	7.
$4 + 7 =$	4	7	11.
$11 - 8 =$	11	8	3.
$3 + 8 =$	3	8	11.
$11 - 3 =$	11	3	8.
$8 + 3 =$	8	3	11.
$9 + 2 =$	9	2	11.
$11 - 2 =$	11	2	9.
$11 - 9 =$	11	9	2.
$2 + 9 =$	2	9	11.
$7 + \quad = 11.$	$11 - \quad =$		4.
$8 + \quad = 11.$	$11 - \quad =$		3.
$9 + \quad = 11.$	$11 - \quad =$		2.
$4 + \quad = 11.$	$11 - \quad =$		9.
$3 + \quad = 11.$	$11 - \quad =$		8.
$2 + \quad = 11.$	$11 - \quad =$		7.

Draw six lines up and down, and five lines from right to left. How many lines have you drawn?

Draw six pans right side up, and five bottom side up. How many pans have you drawn?

Draw six flower-pots with saucers, and five without saucers. How many flower-pots have you drawn?

Draw six hassocks and five crickets. How many foot-stools have you drawn?

Show me six sticks of one color, and five sticks of another color. How many sticks have you shown me?

Two three-cent pieces of money and a five-cent piece are how many cents?

Three two-cent pieces of money and a five-cent piece are how much money?

Who has seen six clothes-pins and five handkerchiefs on the line?

How many things were on the line?

Tell me a story for six and five.

If six and five are eleven, how many are five and six?

Tell me a story for five and six.

If you have six peanuts and five chestnuts, how many nuts have you?

If you eat the five chestnuts, how many nuts will you have?

If you have eleven walnuts, and eat five of them, how many nuts have you left?

If you have eleven cents, and one of the pieces of money is a five-cent piece, and the rest is in cents, how many cent-pieces have you?

If there are eleven beautiful great soap-bubbles floating in the air, and five burst, how many remain? If six had burst, how many would have remained?

I can buy a knife for eleven cents. If I pay for it with a five-cent piece and one-cent pieces of money, how many one-cent pieces do I pay out? If I paid for it with two three-cent pieces and one-cent pieces, how many one-cent pieces did I pay out?

In the school-yard are eleven shade trees. Six are poplar trees, and the rest are elm, maple, and butternut. How many are not poplars?

I bought eleven yards of black lace. I put three yards on each of two parasols. How many yards had I left?

Express: Six and five are eleven.
Five and six are eleven.
Eleven minus five are six.
Eleven minus six are five.

Fill out these expressions:

$11 - 5 =$	11	5	6.
$6 + 5 =$	6	5	11.
$11 - 6 =$	11	6	5.
$5 + 6 =$	5	6	11.
$11 - 4 =$	11	4	7.
$7 + 4 =$	7	4	11.
$11 - 7 =$	11	7	4.
$4 + 7 =$	4	7	11.
$11 - 3 =$	11	3	8.
$8 + 3 =$	8	3	11.
$11 - 8 =$	11	8	3.
$3 + 8 =$	3	8	11.
$11 - 2 =$	11	2	9.
$9 + 2 =$	9	2	11.
$11 - 9 =$	11	9	2.
$2 + 9 =$	2	9	11.
$6 + \quad = 11.$	$11 - \quad$		$= 9.$
$7 + \quad = 11.$	$11 - \quad$		$= 8.$
$8 + \quad = 11.$	$11 - \quad$		$= 7.$
$9 + \quad = 11.$	$11 - \quad$		$= 6.$
$11 + \quad = 11.$	$11 - \quad$		$= 5.$
$11 - \quad = 4.$	$11 - \quad$		$= 3.$
$11 - \quad = 2.$	$11 - \quad$		$= 0.$
$11 + \quad = 11.$	$11 - \quad$		$= 11.$

Exercise for Review.

Two squares and a triangle have how many sides?
Two triangles and a square have how many sides?

Three triangles have how many sides?

Two squares have how many corners?

A square and a triangle have how many corners?

Two triangles have how many corners?

Eleven geese have how many bills?

I saw five oxen with a ball on each horn. How many balls did it take for all the oxen?

My lamp has two shades, a glass shade and a porcelain shade. How many shades will it take for five such lamps?

Five rocking-chairs have how many rockers?

A cabinet-maker made two chests, with five drawers in each chest. How many drawers did he make for both chests?

How many school-days are there in two weeks?

An extension table has five legs. How many legs have two extension tables?

How many leaves has one sheet of paper? How many leaves have five sheets of paper?

Five sheets of paper and a half sheet are how many half sheets of paper?

A week and four days are how many days?

A month and seven weeks are how many weeks?

Two pints and three gills are how many gills?

How many legs and wings, together, has a butterfly?

A week and three days are how many days?

Two months and a half are how many weeks?

Two pints and a half are how many gills?

This line is ten inches long. How long is half the line?

It is ten miles to the Falls. How far is it half-way there?

I can buy slate-pencils at two for a cent. How many cents will ten slate-pencils cost?

How many five-cent stamps can I buy for ten cents? How many two-cent stamps? How many three-cent stamps? How many one-cent stamps?

If lemons are five cents apiece, how many can I buy for ten cents?

How many five-cent pieces does it take to equal ten cents?

I have eleven cents in two pieces of money. What must the pieces of money be?

I have eleven cents in three pieces of money. What may the three pieces of money be? What else may they be?

I have eleven cents in four pieces of money. What may the four pieces of money be? What else may they be? What else may they be?

Two three-cent pieces and a five-cent piece of money equal how many cents?

A five-sided figure and a six-sided figure have how many sides all together?

Eleven chickens have gone to roost. Six are roosting in a tree, and the rest on a fence. How many are roosting on the fence?

There are eleven children in my third class, but five of them got so tired at the Fair that they could not come to school to-day. How many are here?

How many one-cent pencils can you buy for eleven cents? How many two-cent pencils? How many three-cent pencils? How many four-cent pencils? How many five-cent bunches of envelopes? How many six-cent quires of paper? How many seven-cent books? How many eight-cent slates? How many bottles of ink at nine cents a bottle? How many ten-cent watches?

Tell me any two numbers that together make eleven.

Who has some question for the class to answer?

CHAPTER XII.

THE NUMBER TWELVE.

§ 34. The Number Twelve.

Take ten splints. Put them together in a bundle, and put an elastic band about the bundle. Take two more splints. How many splints are in the bundle? How many splints have you besides? Who knows how many splints ten and two are?

Put back the twelve splints. Take twelve again the quickest way. What did you take? (One ten and two.)

Write in words: One ten and two are twelve.

Who can express the number twelve in figures?

How many figures do you use to express twelve? What are the figures? Which figure do you make first in writing twelve? Who thinks what the figure 1 stands for? What does the figure 2 stand for? One ten and two are how many?

Express the number eleven under twelve. Express the number ten in the same column. How many ones in twelve besides the one ten? Point to the figure that stands for the two ones. How many ones in eleven besides the one ten? Point to the figure that stands for the one. How many ones in ten besides the ten ones? Point to the figure that shows there are no ones.

If you have been to school two weeks and two days this term, how many days have you been to school?

If there are ten great yellow cucumbers cut into Jack-o-Lanterns, and two more waiting to be cut into Jack-o-Lanterns, how many cucumbers are there all together?

Rose is ten years old. Her brother is two years older. How old is her brother?

If there are ten boys playing Fox and Geese, and two more boys join them, how many boys are playing Fox and Geese?

There are ten rooms in our house besides the two attic rooms. How many rooms are there with the attic rooms?

Who will ask me a question about ten and two? Frank, ask Charley a question about ten and two. Nellie, ask Mary a question about ten and two.

Ten apple turnovers and two apple turnovers are how many?

Ten beautiful girl-dolls and two soldier-dolls are how many dolls?

If ten and two are twelve, two and ten are how many?

Two jugs and ten pitchers are how many things?

Two saucers and ten butter-plates are how many dishes?

Two knives and ten forks are how many things?

Two children in the middle of a ring, and ten in the ring make how many children?

If the two that are in the middle of the ring run away, how many will be left?

If twelve girls are playing Drop the Handkerchief, and two fall out of the ring, how many are left?

If twelve boys are playing King's Land, and two get caught, how many will be left to play?

There are twelve working days in two weeks. How many working days are there in two weeks minus two days?

Show me twelve splints. Take away ten splints, and tell me how many remain.

Tell me about twelve chimney swallows, and two came down the chimney into the room. About twelve eggs, and two were used for cake. About twelve months in the year, and you were away visiting two months in the year.

If you have twelve cents, and spend ten cents, how many cents will you have?

If I have twelve postal cards, and use ten, how many postal cards shall I have?

If I teach ten months in the year, how many months have I for vacation?

If I have twelve cents in two pieces of money, and one of the pieces of money is a ten-cent piece, what is the other piece of money?

There were ten cows and a pair of oxen feeding in a pasture. How many cattle were in the pasture?

There were twelve books lying on my table, and I put all but two on the book-case. How many did I put on the book-case?

It will take two yards of trimming for my dress, and ten yards of dress goods. How many yards of material must I buy for my dress?

There are twelve tacks in my screen, but two have lost their heads. How many are whole?

Stand twelve spools up for soldiers. Make them march by twos. How many twos are there in the twelve?

Call the spools gate posts. If it takes two for each gate, how many gates can you supply with posts?

Call these twelve sticks shafts for carriages. For how many carriages have you shafts? Call them curtain sticks. If it takes two for each curtain, how many curtains can you supply?

Call them sled runners. How many sleds can you supply with runners?

Tell me a story for twelve divided by two.

If there are six twos in twelve, how many twos make twelve?

Six boys have how many eyes? how many ears? how many shoulders? how many feet? how many arms?

Six jackets have how many sleeves?

Six pairs of trousers have how many legs?

Two flies have six times as many legs as a boy. How many legs have two flies?

Jennie is two years old, and Harry is six times as old. How old is Harry?

A small pail holds two quarts. The water-pail holds six times as much. How much does the water-pail hold?

I will give you another name for twelve. We call it a dozen.

A dozen eggs are how many eggs?

A dozen baskets of wood are how many baskets of wood?

A dozen fruit cans are how many cans?

A dozen persons are how many persons?

A dozen peaches are how many peaches?

Where have you heard the word dozen before?

Whenever you hear the word, of what number will you think?

How many pairs of boots in a dozen boots?

If you buy a dozen eggs, and use two eggs, how many eggs have you left?

If you use ten eggs, how many eggs have you left?

If the family eats a dozen tomatoes for dinner, how many tomatoes are eaten?

Express: Ten and two are twelve.
Twelve minus two are ten.
Twelve minus ten are two.
Two and ten are twelve.
Twelve divided by two are six.
Six twos are twelve.

Fill out these blanks:

10 + 2 =		10	2 12.
12 − 2 =		12	2 10.
2 + 10 =		2	10 12.
12 − 10 =		12	10 2.
12 − = 10.		12 divided by 2 =	
10 + = 12.		6 twos =	
12 − = 2.		12 divided by = 6.	
2 + = 12.		6 = 12.	

A farmer, in counting his eggs for the market, found he had ten dozen and nine more eggs. Who can find how many eggs he lacked of another dozen?

Nine eggs and three eggs are how many eggs?

If I have three three-cent pieces, and three one-cent pieces of money, how much money have I?

Annie had nine cents, and Nellie had a three-cent piece. How much money had both?

If you begin school at nine in the morning, and are in school three hours, what time is it when you are dismissed?

If Johnny falls asleep at nine o'clock, but wakes when the clock is striking twelve, how many hours has he been asleep?

I can start from the railroad station at nine in the morning, and get to Boston at noon. How many hours' ride is it to Boston?

James bought a dozen eggs at the store, but tipped three out of his basket on the way home. How many had he when he reached home?

We put up a dozen cans of peaches one fall, but gave away three cans. How many cans did we have for our own use?

I can buy little boxes of pens with a dozen pens in each box. If I use nine out of a box, how many will remain in the box?

I picked a dozen quarts of berries, and sold nine quarts. How many quarts did I keep for my own use?

There are a dozen panes of glass to be set in a window. When nine are set, how many more are to be set?

If I have a dozen pencils to sharpen, and sharpen nine of them, how many pencils shall I still have to sharpen?

I had a box of thread with a dozen spools in it, but have used nine spools. How many spools have I left?

Who can tell me about nine tops and three tops? nine houses and three barns? nine crows and three scare-crows? nine watermelons and three green pumpkins?

Draw three tops on the board; draw below them nine others. How many tops have you drawn?

Draw anything you choose to show that three and nine are twelve.

If I have nine peaches, how many more peaches must I have to make a dozen peaches? What then is the difference between nine and twelve?

If Susie finds a dozen pins, and Mary finds only nine, how many more pins does Susie find than Mary?

Some kinds of candy are nine cents a quarter, and other kinds are twelve cents a quarter. What is the difference in price?

Some lace is nine cents a yard, and other lace is twelve cents a yard. What is the difference in price?

If I have three sheets of paper, how many more sheets of paper must I have to make a dozen sheets of paper? What then is the difference between three and twelve?

Who knows how many threes there are in twelve? Twelve divided by three are how many?

How many boxes will it take for twelve dozen eggs if you pack three dozen eggs in each box?

I have twelve cents in three-cent pieces. How many three-cent pieces have I?

How many three-cent stamps can I buy for twelve cents? How many three-cent pencils? How many three-cent rubbers?

How many three-quart pails will it take to hold twelve quarts of cranberries?

Who will tell me a story about twelve divided by three?

Draw twelve bottles on the board, and put them in rows of three each. How many rows of bottles have you?

Four rows of bottles, with three in each row, are how many bottles?

If a dozen buttons are arranged on a card in rows of three each, how many rows of buttons are there?

Four rows of buttons, with three buttons in a row, are how many buttons?

Four velocipedes have how many wheels, if each velocipede has three wheels?

A tricycle has three wheels. How many wheels have four tricycles?

My little basket watch-stand has three legs. How many legs will four such watch-stands have?

Most pitchforks have three tines each. How many tines do four pitchforks have?

Four horse-cars, with three horses attached to each car, have how many horses?

Four houses, with three chimneys each, have how many chimneys?

Tell me a story for four threes.

Express: Nine and three are twelve.
Twelve minus three are nine.
Three and nine are twelve.
Twelve minus three are nine.
Twelve divided by three are four.
Four threes are twelve.

Finish these expressions:

12 − 3 =	12	3	9.
9 + 3 =	9	3	12.
12 − 9 =	12	9	3.
3 + 9 =	3	9	12.
12 − 2 =	12	2	10.
12 − 10 =	12	10	2.
10 + 2 =	10	2	12.
2 + 10 =	2	10	12.
6 twos =	12 divided by 2 =		
4 threes =	12 divided by 3 =		
12 − = 9.	9 + = 12.		
12 − = 3.	3 + = 12.		
12 − = 2.	2 + = 12.		
12 − = 10.	10 + = 12.		
6 = 12.	12 2 = 6.		
4 = 12.	12 3 = 4.		

If I cut a pie into four equal parts, what part of the pie is each piece? If I separate a number into four equal groups, what part of the number is each group?

You may separate twelve into four equal groups. What part of twelve is each group? Show me one-fourth of twelve. What is one-fourth of twelve?

If I have a dozen apples, and give you one-fourth of what I have, how many apples shall I give you?

If I have a dozen geranium blossoms, and one-fourth of them drop off, how many blossoms drop off?

If I use a quarter of a dozen eggs, how many eggs shall I use?

There are twelve months in a year. One-fourth of the year is how many months? Summer is one-fourth of the year. How long is Summer?

Winter is one-fourth of the year. How long is Winter? Each of our seasons is one-fourth of the year. How long is each season?

If I divide twelve chocolate mice equally among four little girls, how many chocolate mice shall I give to each?

I have a three-cent piece in my hand, which is one-fourth of all the money I have. How much money have I?

Ada spent three weeks in the country, which was one-fourth of her vacation. How long was her vacation?

John was absent from school a fourth of the term. He was absent three weeks. How long was the term?

A gentleman received three letters one day, which was only one-fourth of what he usually received. How many did he usually receive?

Who has a story for one-fourth of twelve?

Express this fact a dozen times on the board ($\frac{1}{4}$ of 12 is 3).

Here are some paper patterns. Each take eight of a kind. What have you taken, Bessie? (Butterflies.) Take four more butterflies. Harry? (Horses.) Take four more horses. Nellie? (Brooms.) Take four more brooms. John? (Shovels.) Take four more shovels. How many butterflies have you, Bessie? Eight butterflies and four butterflies are how many butterflies? How many horses have you, Harry? Eight horses and four horses are how many horses? How many brooms have you, Nellie? Eight brooms and four brooms are how many brooms? How many shovels have you, John? Eight shovels and four shovels are how many shovels?

Each write: Eight and four are twelve, a dozen times on the board.

Let the eight and four change places, and read the expression (Four and eight are twelve).

Who has an example for four and eight?

I agreed to dress a dozen paper dolls for the Fair. I have dressed eight dolls. How many more must I dress?

Eight and how many more are twelve? A wheel, then, that has only eight spokes needs how many more spokes to make twelve spokes?

I can buy a dozen sheets of tissue paper for eight cents. Silver paper costs a cent a sheet. How much more will a dozen sheets of silver paper cost than a dozen sheets of tissue paper?

When dates are eight cents a pound, and figs twelve cents a pound, what is the difference in price?

Express on the board the difference between twelve and eight.

Twelve is four more than what number?

Eight is four less than what number?

Twelve is eight more than what number?

Four is eight less than what number?

Draw on the board twelve pins, putting four pins in each row. How many rows have you?

A gardener has twelve plants which he is going to set out in clusters of four each. How many clusters can he make?

Here are twelve sticks of equal length. How many separate squares can you form with them?

Twelve horse-shoes will supply how many horses with shoes if they need shoeing all round?

Twelve dollars will pay for how many weeks' board, if you pay four dollars a week?

A ten-cent piece and a two-cent piece will buy how many oranges at four cents apiece?

Who can express this fact on the board? (12 divided by 4 = 3.)

Express it just as many times as there are fours in twelve?

Here are three horses. How many legs have they altogether?

Here are three table-forks, and each fork has four tines. How many tines have the three forks together?

Three chairs have how many legs?

Three squares have how many sides? have how many corners?

One sheet of note-paper has how many pages? Three sheets have how many pages?

If I embroider a flower in each corner of a square table-cover, how many flowers must I embroider in three such table-covers?

Three four-pound weights are equal to how many pound weights?

If I measure three pints of milk with a gill dipper, how many times must I fill the dipper?

Three four-wheeled carriages have how many wheels?

Express this fact on the board (3 fours = 12).

You may divide twelve into three equal groups. What part of twelve is each group? Show me one-third of twelve. How many do you show me in one-third of twelve?

If snow is on the ground one-third of the year, how many months is snow on the ground?

Susie had a dozen paper dolls, but a third of them got torn. How many got torn?

A man who had a dozen balloons to sell, sold a third of them to one boy. How many did the boy buy?

A carriage-maker has just finished a dozen wheels. He will use a third of them for one carriage. How many wheels will he use for that carriage?

A cooper who has a dozen cask-hoops will use four on a cask. What part of the number of hoops he has will he use for one cask?

I have four cents, which is one-third enough money to buy a dozen sugar cookies. How much are the cookies a dozen?

I have four pencils. What part of a dozen pencils have I?
Four is what part of twelve?
One-third of twelve is how many?
Give me an example for one-third of twelve?

Write: One-third of twelve is four.
Eight and four are twelve.
Twelve minus eight are four.
Four and eight are twelve.
Twelve minus four are eight.
Twelve divided by four are three.
Three fours are twelve.
One-fourth of twelve is three.

Fill out these expressions:

8 + 4 =	8	4	12.
12 − 4 =	12	4	8.
4 + 8 =	4	8	12.
12 − 8 =	12	8	4.
9 + 3 =	9	3	12.
12 − 3 =	12	3	9.
3 + 9 =	3	9	12.
12 − 9 =	12	9	3.
10 + 2 =	10	2	12.
12 − 10 =	12	10	2.
2 + 10 =	2	10	12.
12 − 2 =	12	10	2.
6 twos =	4 +		= 12.
4 threes =	8 +		= 12.
3 fours =	9 +		= 12.
$\frac{1}{4}$ of 12 is	10 +		= 12.
$\frac{1}{3}$ of 12 is	3 +		= 12.
12 divided by 2 =	2 +		= 12.
12 divided by 3 =	12 −		= 8.
12 divided by 4 =	12 −		= 4.

If Ned has eight cents, and Harry four cents, how many cents have both? If Ned pays Harry a cent, how many cents will both have? How many cents will *each* have? Seven cents and five cents are how many cents?

Give examples for seven and five.

If I have seven peaches, how many more peaches must I have to make a dozen peaches?

If I lack five of a dozen, how many have I?

Seven candle-sticks were on the table a moment ago. Now there are twelve. How many have been added to the number that was there first?

A dozen turkeys went off in the wet grass one morning, and only seven came back. How many were missing?

Twelve milk-cans were drying on a bench, but the wind blew seven off on the ground. How many cans were left on the bench?

John had but five cents this morning. Now he has twelve cents. How many cents has he earned through the day?

Express on the board the difference between twelve and seven.

Express on the board the sum of seven and five.

Express the difference between twelve and five.

Ben had seven nuts, George had five nuts. How many nuts had they together? Ben gave one of his nuts to George. How many had both then? How many had *each?* Six nuts and six nuts are how many nuts?

Give me stories for six and six.

Twelve is how many more than six?

Six and how many more are twelve?

If there are a dozen books in one pile, and six in another pile, how many more books are in one pile than in the other?

If I have a dozen beautiful colored leaves, and you have only six leaves, how many more have I than you?

I have six beautiful butterflies that were given me by a little boy. He says he is going to give me a dozen. How many more will he need to give me?

Express on the board the sum of six and six.

Express the difference of twelve and six.

If six and six are twelve, how many sixes are there in twelve?

Divide twelve by six, and see if two is the answer.

Twelve apples will make how many puddings if six apples are required for each pudding?

Twelve yards of dress goods will make how many dresses if six yards are required for each dress?

Who has a story for twelve divided by six?

If there are two sixes in twelve, how many sixes make twelve?

Two window sashes, with six panes of glass in each sash, contain how many panes of glass?

Two cubes have how many faces?

How much will two six-cent books cost?

How much will two lamps cost at six dollars apiece?

I sent two books through the mail. One weighed six ounces, and the other weighed twice as much. How many ounces did the heavier book weigh?

What two equal numbers make twelve?

What then is one-half of twelve?

What distance is one-half of twelve miles?

How many eggs in a half-dozen eggs?

How many months in half a year?

This rule is twelve inches long. How long is half the rule?

If twelve persons can sit on two settees, how many persons can sit on one settee?

It takes twelve hours for the short hand to go round the face of the clock. How many hours will it take the hand to go half-way round?

If a gentleman gets twelve letters in a single mail, and answers half of them immediately, how many does he answer at once?

Tell me a story for one-half of twelve?

Express on the board:

The sum of six and six.
The difference of twelve and six.
One-half of twelve.
Twelve divided by six.
The number of sixes that make twelve.

Fill out these expressions:

$\frac{1}{2}$ of 12 =	6 + = 12.
$\frac{1}{3}$ of 12 =	7 + = 12.
$\frac{1}{4}$ of 12 =	8 + = 12.
6 twos =	9 + = 12.
4 threes =	10 + = 12.
3 fours =	12 − = 6.
2 sixes =	12 − = 0.
12 − 2 =	12 − = 7.
12 − 3 =	12 − = 1.
12 − 4 =	12 − = 8.
12 − 5 =	12 − = 2.
12 − 6 =	12 − = 9.
12 − 12 =	12 − = 3.
12 − 11 =	12 − = 10.
12 − 10 =	12 − = 4.
12 − 9 =	12 − = 5.
12 − 8 =	12 − = 11.

The Sign ×.

Read these expressions:

2 twos = 4.	2 sixes = 12.
2 threes = 6.	3 fours = 12.
3 threes = 9.	2 fives = 10.
3 twos = 6.	5 twos = 10.
2 fours = 8.	4 threes = 12.
4 twos = 8.	6 twos = 12.

(At each correct reading introduce the sign of multiplication together with the required figure. The expressions will then stand:

$2 \times 2 = 4$.	$2 \times 6 = 12$.
$2 \times 3 = 6$.	$3 \times 4 = 12$.
$3 \times 3 = 9$.	$2 \times 5 = 10$.
$3 \times 2 = 6$.	$5 \times 2 = 10$.
$2 \times 4 = 8$.	$4 \times 3 = 12$.
$4 \times 2 = 8$.	$6 \times 2 = 12$.)

Read these expressions:	Write in this new way:
Two twos are four.	Eight zeros are zero.
Two sixes are twelve.	Eleven ones are eleven.
Five ones are five.	Twelve ones are twelve.
Seven ones are seven.	Six twos are twelve.

Complete:

$2 \times 2 =$		2	$6 = 12$.
$3 \times 2 =$		2	$5 = 10$.
$4 \times 2 =$		3	$4 = 12$.
$5 \times 2 =$		4	$3 = 12$.
$6 \times 2 =$		6	$2 = 12$.
$2 \times 3 =$		2	$4 = 8$.
$3 \times 3 =$		4	$2 = 8$.
$4 \times 3 =$		2	$3 = 6$.
$2 \times 4 =$		3	$2 = 6$.
$3 \times 4 =$		3	$3 = 9$.
$2 \times 5 =$		5	$2 = 10$.
$2 \times 6 =$		2	$2 = 4$.

The Foot.

You may each take one of these strips of paper. Who knows how long the strip of paper is? It is a foot long.

Draw a line on the board a foot long; draw another line just as long extending in some other direction. How long is it?

Measure off a foot on the edge of the table; on the edge of the platform; on the edge of the blind; on the edge of the blackboard; on the round of the chair; on the round of the settee; on the leg of the chair; on the leg of the settee; on the desk; on the piano; on your slate if you can. Whose slate has a side a foot long? Extend your arms with your hands a foot apart. I will measure the distance between your hands.

Lay off on your arm the distance of a foot. I will see if my foot-measure will just fit the distance.

What have you seen at home that is a foot in length? Who has seen any one measure with a foot-rule before to-day?

This foot-rule is marked off into short distances. How long is each distance? (An inch.) How many inches long is this foot-rule? How many inches long is the line you drew? How many inches apart are your hands if you hold them a foot apart? How many inches is your step if it is a foot long? If you stand a foot apart from each other, how many inches apart are you?

Tell me a story for twelve inches in a foot.

How many inches in half a foot?

If you draw a square a half a foot on each side, how many inches long is a side of the square?

In one-fourth of a foot how many inches? Which is longer, one-half of a foot or one-fourth of a foot? How many quarters of a foot does it take to make a half a foot?

How many inches in one-third of a foot? Which is more, one-half, one-third, or one-fourth of a foot? Which is more, one-third or one-fourth of a foot?

Write on the board what you have found out about the number of inches in a foot, as I have written it (12 inches = 1 foot). Write the expression a half dozen times.

Exercise for Review.

Six books have how many covers?

Six sheets of note-paper have how many leaves?

Six pairs of scissors have how many blades?

Let this circle represent a wheel. Let these eight lines represent spokes. How many more spokes does it need to have twelve spokes?

There are twelve panes of glass in each of my windows. The panes are arranged in rows of three each. How many rows in each window?

I can make a pretty design by drawing four maple leaves. If I make three such designs, how many maple leaves shall I draw?

Nellie is putting a border on the board in squares. She puts two leaves in each square. How many leaves will she put in five squares? in six squares?

Annie is drawing a border in circles. She will put six leaves in each circle. How many leaves will she put in two circles?

Cyrus has just finished the twelfth leaf of his writing-book, and is half way through the book. How many more leaves has he to write? If he writes three leaves a week, how many weeks will be required to finish the book? What part of a month? What part of the term if there are twelve weeks in a term?

I have a silver vase with three cups. How many cups have four such vases?

How many handles have six trunks if three of them have lost a handle each?

Three squares have how many sides?

Four triangles have how many sides?

Six cylinders have how many plane faces?

Two cubes have how many faces?

A foot-rule is how many inches in length? One-half a foot is how many inches? One-fourth of a foot? One-third of a foot?

Six clothes-pins have how many legs?

How many heads have eleven clothes-pins?

How many eyes have eleven buttons?

A half dozen boys were watching a monkey dance, and five more came to see the fun. How many boys were watching the monkey then?

The Wide Awake comes once a month. I have the numbers for half a year, and for five more months. How many numbers have I?

If two books come each month, how many will I get in five months and a half?

If two come each month, how often do they come by the week? How many shall I have received in twelve weeks?

I have read of a giant that was seven feet tall. A room in your house is ten feet high. How much difference is there between the height of your room and this giant?

A lady brought home six monkeys and five parrots as pets. She tied the monkeys to the fence, and hung the parrot cages on a tree near the fence. How many pets could the children count as they stopped to watch them?

There were seven visiting cards in my card-receiver this morning. Now there are eleven. How many callers have I had during the day if each brought a card?

There are eight tones in the musical scale. If you can sing the scale and three more tones, how many tones can you sing?

If there are three ripe pumpkins, and eight green pumpkins in the field, how many pumpkins are in the field?

If you are to go away from home the eleventh of the month, and it is now the eighth of the month, how many days have you at home counting to-day?

From the third of the month to the eleventh of the month are how many days counting the third?

Neddie and Harry were counting the rails in a fence. Neddie counted by ones, and Harry counted by twos. Who counted them quickest? How could you count them quicker still?

If you count twelve by ones, how many numbers must you name over to yourself? If you count twelve by twos, how many numbers will you name over to yourself? If you count twelve by threes, how many numbers will you name?

You may go about the room and make believe you are out of doors. When you come back I shall ask you what you saw, how many you saw, and how you counted them. What did you see, Ellen? (Trees in an orchard.) How many? (Twelve.) How did you count them? (By threes.) Let me hear you count twelve by threes. What did you see, Grace? (Doves in the path.) How many? (Ten.) How did you count them? (By twos.) Count ten by twos. What did you see, Henry? (Cows in the pasture.) How many? (Nine.) How did you count them? (By threes.) Count nine by threes. What did you see, Willie? (Butterflies.) How many? (Seven.) How did you count them? (By ones.) Why did you count them by ones? (Because they were all flying about.)

You may form a circle. George may stand in the centre and remain until he fails to tell me how many:

Four and three?	Six and three?
Eight and three?	Seven and three?
Nine and three?	Five and three?
Five and four?	Seven and four?
Six and four?	Eight and four?
Seven and five?	Six and five?
Six and six?	Two sixes?
Two fives?	Two threes?
Two fours?	Three threes?
Three twos?	Three fours?

Each take twelve blocks. Call them chickens. Close your eyes. (Teacher removes a number from each group.) Open your eyes and tell me about your loss.

Mary. I had twelve chickens; now I have but eight. I have lost four.

Willie. I had twelve chickens; now I have but six. I have lost six.

Nettie. I had twelve chickens and have lost five, so I have but seven chickens.

How many have you lost, Harry? (Three.) Mamie? (Two.) Bertie? (Eight.) Susie? (Nine.)

Each take five blocks. Call them cents. Close your eyes again. (Teacher adds a number to each group.) Open your eyes and tell me what you have gained.

Annie. I had five cents; now I have eight cents. I have gained three cents.

Helen. I had five cents; now I have ten cents. I have gained five cents.

How many have you gained, John? (Six.) Lizzie? (Four.) James? (Two.) Ned? (Five.) Ralph? (Seven.) Henry? (Three.) George? (Eight.)

CHAPTER XIII.

THE NUMBER THIRTEEN.

§ 35. The Number Thirteen.

Take ten splints. Put them into a bundle, and put this band about them.

Take three more splints. How many are in the bundle? How many more have you? Who knows how many each has all together? Thirteen is the right number. Put the splints back. Take thirteen the quickest way. (One ten and three.) What did you take? (One ten and three.) One ten and three are how many? Write this in words on the board. (One ten and three are thirteen.)

Show me the number of tens in thirteen. (Let teacher put the figure **1** over the phrase "one ten.") Show me how many ones besides. (Let the figure **3** be placed over the word three.) Who can express thirteen in figures? Show me the figure that stands for the number of tens; for the number of ones besides. Express twelve below thirteen. Express eleven in the same column. Express ten. How many tens in each of these numbers? How many tens all together? How many ones all together?

Ralph brought me ten cents for a book, and three cents for a pencil. How many cents did he bring me?

Ten crackers and three crackers are said to be a baker's dozen. How many make a baker's dozen?

If there are ten Japanese lanterns on a tree, and I hang three more on the tree, how many Japanese lanterns are then on the tree?

If there are thirteen Japanese lanterns in a tree, and three burn out, how many will remain in the tree?

If there are thirteen persons in our family, and three go away, how many persons will remain in our family?

If there are thirteen sticks of wood in the basket, and I put three in the fire, how many will remain in the basket?

If three must be added to ten to give thirteen, what number must be taken from thirteen to leave ten? Since thirteen minus three equals ten, thirteen minus ten will equal what number?

What is the difference between thirteen and ten? between thirteen and three?

If one kind of syrup is ten cents a quart, and another kind is thirteen cents a quart, what is the difference in price?

Mabel is three years old, and John is thirteen years old. What is the difference in their ages?

Express on the board the sum of ten and three.

$$(10 + 3 = 13.)$$

Express the difference of thirteen and three.

$$(13 - 3 = 10.)$$

Express the difference of thirteen and ten.

$$(13 - 10 = 3.)$$

I wish for a story for what you have expressed on the board.

If there were ten boys standing in one group, and three boys in another group, how many boys were there in both groups? If one of the ten boys should join the other group, how many would there be in both groups? How many in each group? Nine boys and four boys are how many boys?

Nine hours of work and four hours of work are how many hours of work?

Who has a story for nine and four?

What number must be put with nine to give thirteen? Then four subtracted from thirteen will give what number?

There were thirteen swallows' nests in a sand-bank, but the bank gave way and destroyed four nests. How many were left?

I had a ten-cent piece and a three-cent piece of money. I spent four cents. How many cents did I have then?

If you have two five-cent pieces of money, and a three-cent piece, and spend the three-cent piece and one more cent, how many cents will you have?

Nine and what number are thirteen?

What number subtracted from thirteen leaves nine?

Since thirteen minus four leaves nine, thirteen minus nine will leave what number?

Tell a story for thirteen minus nine.

Express on the board the sum of nine and four.

Express the difference of thirteen and four.

Express the difference of thirteen and nine.

Tell me what to put in these blanks:

10 + 3 =	10	3	13.
9 + 4 =	9	4	13.
13 − 3 =	13	3	10.
13 − 4 =	13	4	9.
13 − 10 =	13	10	3.
13 − 9 =	13	9	4.

A squirrel has four toes on each forefoot, and five toes on each hind foot. How many toes has he on both forefeet and one hindfoot?

Two tables with each four legs, and one table with five legs, have how many legs all together?

Four two-cent stamps and a five-cent stamp cost how much?

A bench that is eight feet long and five feet wide measures how many feet on one side and one end together?

Eight and five equal what number?

Eight and what number equal thirteen?

Eight is how many less than thirteen?

If there are thirteen matches in a card, and I use five, how many will be left?

If to-day is the thirteenth of the month, how many days ago was the eighth of the month?

If this room is thirteen feet in width, how much wider is it than a small room that is only eight feet wide?

A room is thirteen feet wide, and eight feet high. What is the difference in width and height?

Give me a story for what I express:

$8 + 5 = 13.$	$13 - 8 = 5.$
$5 + 8 = 13.$	$13 \times 1 = 13.$
$13 - 5 = 8.$	$12 + 1 = 13.$
$13 - 1 = 12.$	$11 + 2 = 13.$

Henry had eight cents, and John had five cents. How many cents had both? Henry paid John one cent. How many cents had each of the boys then? How many cents had they together? What new pair of numbers have you just found make thirteen?

Tell me a story for seven and six.

A square and a triangle and a six-sided figure have how many sides?

How many weeks and days in thirteen days?

George had thirteen cents. If he had two three-cent pieces, and the rest of his money in one-cent pieces, how many one-cent pieces of money had he?

There are thirteen children in one division, and six of the children are girls. How many boys are in the division?

Of thirteen sheep in a flock, six were sold. How many were left of the flock?

There are thirteen pegs on a hat-rack. Six are covered with hats. How many can be seen?

Complete these expressions:

$6 + 7 =$	$6 + \quad = 13.$
$13 - 6 =$	$13 - \quad = 6.$
$13 - 7 =$	$13 - \quad = 7.$
$7 + 6 =$	$7 + \quad = 13.$
$8 + 5 =$	$8 + \quad = 13.$
$13 - 5 =$	$13 - \quad = 8.$
$13 - 8 =$	$13 - \quad = 5.$
$5 + 8 =$	$5 + \quad = 13.$
$9 + 4 =$	$9 + \quad = 13.$
$13 - 4 =$	$13 - \quad = 9.$
$13 - 9 =$	$13 - \quad = 4.$
$4 + 9 =$	$4 + \quad = 13.$
$10 + 3 =$	$10 + \quad = 13.$
$13 - 10 =$	$13 - \quad = 3.$
$13 - 3 =$	$13 - \quad = 10.$

CHAPTER XIV.

THE NUMBER FOURTEEN.

§ 36. The Number Fourteen.

Take a bundle of ten splints. Take four more splints. How many splints have you taken in all? Show me what makes fourteen. Tell me what makes fourteen. Write it in words on the board. (One ten and four are fourteen.)

Who will express fourteen in figures?

Which figure shows the number of tens in fourteen? Which figure shows the number of ones that must be put with ten to give fourteen?

Express thirteen just below fourteen. Express twelve in the same column; eleven; ten. How many tens in fourteen? in thirteen? in twelve? in eleven? in ten? Point to the column of tens.

What must be put with ten to give fourteen? to give thirteen? to give twelve? to give eleven? to give ten? Point to the column of ones.

A ten-cent piece of money, and two two-cent pieces of money, are how much money?

If there are ten buttons on a string, and I put four more buttons on the string, how many buttons will then be on the string?

I wish to place my boys in rows with fourteen in each row. After placing them I find I have only four boys for the last row. How many more do I need to have the row filled?

A room is fourteen feet wide. How many feet will a ten-foot pole lack of reaching across the room?

There were fourteen rails along the balustrade, but four got broken. How many rails were then along the balustrade?

Some boys who went for berries took with them a fourteen-quart pail. They picked ten quarts of berries. How many more quarts would their pail hold?

I have ten pictures in my album, and it will hold four more pictures. How many pictures will my album hold?

Take fourteen. How many tens have you? How many ones besides? How many twos in ten? How many twos in four? How many twos in ten and in four together? How many twos in fourteen?

If I sell fourteen pencils in one morning, and sell two to each child, to how many children will I sell the pencils?

If you have fourteen cents in two-cent pieces, how many two-cent pieces have you?

If a gem-pan has fourteen cups, two in each row, how many rows of cups has it?

If the blackboard is fourteen feet long, how many two-foot rules could be placed along its edge?

If a room is fourteen feet long, how many chairs, each two feet in width, can be placed along the side of the room?

If fourteen pounds of butter are put into lumps which weigh two pounds each, how many lumps of butter can be made from the fourteen pounds?

Who has examples for fourteen divided by two?

Express this fact a half dozen times on the board.

(14 divided by 2 = 7.)

If each chestnut-burr has two nuts in it, how many burrs must you find to get fourteen nuts? Seven chestnut-burrs then, with two nuts in each burr, will have how many chestnuts?

Seven boys will wear how many shoes?

Seven pairs of skates are how many skates?

Seven yoke of oxen are how many oxen?

Seven spans of horses are how many horses?

I have two cents. How many cents must you have to have seven times as many cents as I have?

Ada is two years old. Jennie's age is seven times Ada's age. How old is Jennie?

If we eat two pounds of butter a day on the table, how many pounds shall we eat in a week?

If I write two letters a day, how many letters shall I write in a week?

Fill out:

$10 + 4 =$	10	4	14.
$14 - 4 =$	14	4	10.
$14 - 10 =$	14	10	4.
$4 + 10 =$	4	10	14.
$7 \times 2 =$	7	2	14.
$6 \times 2 =$	14 divided by 2 =		
$5 \times 2 =$	12 divided by 2 =		
$4 \times 2 =$	10 divided by 2 =		
$3 \times 2 =$	8 divided by 2 =		
$2 \times 2 =$	6 divided by 2 =		

The Sign ÷.

Who knows what words are omitted in these expressions:

6	$2 = 3.$	12	$2 = 6.$
8	$4 = 2.$	12	$3 = 4.$
9	$3 = 3.$	12	$4 = 3.$
8	$2 = 4.$	12	$6 = 2.$
14	$2 = 7.$	12	$12 = 1.$

(Let the teacher introduce the sign of division as the correct phrase is given in each case. Have the expressions in their new form read.)

Read these expressions:

$2 \div 1 = 2.$	$14 \div 2 = 7.$
$7 \div 1 = 7.$	$14 \div 14 = 1.$
$14 \div 1 = 14.$	$14 \div 2 = 7.$
$12 \div 1 = 12.$	$12 \div 6 = 2.$
$13 \div 1 = 13.$	$12 \div 2 = 6.$
$12 \div 3 = 4.$	$12 \div 4 = 3.$

Write in the new way:

Eight divided by two are four.
Ten divided by two are five.
Twelve divided by two are six.
Fourteen divided by two are seven.
Eight divided by four are two.
Ten divided by five are two.
Twelve divided by six are two.
Nine divided by three are three.
Twelve divided by three are four.
Twelve divided by four are three.

Take fourteen. If you take one from the bundle of tens and put it with four, what two numbers will you show me?

Nine and five are how many?

Tell me a story for nine and five.

It is nine hours since I got up this morning. If I sit up five hours longer, how many hours will there be in my day?

A room in our cottage is nine feet high. The church is five feet higher. How high is the church?

If I have three three-cent pieces, and a five-cent piece of money, how much money have I?

Annie bought three peaches at three cents apiece, and five one-cent rolls of lozenges. How much money did she spend?

I had fourteen dollars in dollar bills. I exchanged five of the bills for a five-dollar bill. How many dollar-bills had I then?

There are fourteen days in two weeks. If five days are stormy, how many days are pleasant?

I received fourteen letters this morning, and have answered five. How many more have I to answer?

Jennie had fourteen cocoanut cakes. She gave three to each of her two brothers, kept three herself, and gave the rest to her mother. How many did she give her mother?

I sent two packages by mail that cost fourteen cents. If one of the packages required three three-cent stamps, how much did it cost to send the other package?

If white sugar is nine cents a pound, and maple sugar is fourteen cents a pound, what is the difference in price?

I bought two chairs last week. One cost five dollars and the other fourteen dollars. What was the difference in price?

Express on the board the sum of nine and five.

Express the difference of fourteen and nine.

Express the difference of fourteen and five.

Fill out these expressions:

$9 + 5 =$	9	5	14.
$14 - 9 =$	14	9	5.
$14 - 5 =$	14	5	9.
$5 + 9 =$	5	9	14.
$10 + 4 =$	10	4	14.
$14 - 4 =$	14	4	10.
$14 - 10 =$	14	10	4.
$4 + 10 =$	4	10	14.
$7 \times 2 =$	7	2	14.
$14 \div 2 =$	14	2	7.
$12 \div 2 =$	$12 \div 3 =$		
$10 \div 2 =$	$9 \div 3 =$		
$8 \div 2 =$	$6 \div 3 =$		
$6 \div 2 =$	$3 \div 3 =$		
$4 \div 2 =$	$12 \div 4 =$		
$2 \div 2 =$	$8 \div 4 =$		

Divide fourteen into two such numbers, that one number will be two more than the other number.

What are the two numbers?

Tell me stories for eight and six.

Two squares and two triangles have how many corners together?

A spider with eight legs, and a fly with six legs, have how many legs all together?

Four two-cent pieces of money, and two three-cent pieces of money, are how much money?

I saw two dogs and three boys scampering down the lane. How many feet were scampering over the path?

Two horses got in the farmer's clover, and three boys went to drive them out. How many feet were there trampling down the clover?

A farmer, who had fourteen sheep, sold six sheep. How many sheep had he left?

I ordered some dress goods two weeks ago, and had to wait six days before it came. How many days ago did I receive the goods?

A man who had ten cows and four horses sold six animals. How many had he left?

If you have three three-cent pieces of money, and a five-cent piece, and spend two three-cent pieces, how much money will you have left?

If a hall is fourteen feet high, and a man six feet in height, what is the difference in height?

A boy, who had fourteen quarts of berries to sell, has sold a half-dozen quarts. How many quarts has he left to sell?

Frank picked his pint-cup full of raspberries fourteen times. Three quarts of the raspberries were eaten on the table, and the rest made into sauce. How many pints of the raspberries were made into sauce?

What number taken from fourteen leaves six? What number taken from fourteen leaves eight?

Eight and how many are fourteen?

Six and how many are fourteen?

Fourteen are how many more than six?

Fourteen are how many more than eight?

Express the sum of eight and six, on the board, a half dozen times.

Express the difference of fourteen and six, half as many times.

Fill out the blanks I have left:

8 + 6 =	14 − 4 =	6 ÷ 3 =
9 + 5 =	7 × 2 =	9 ÷ 3 =
10 + 4 =	14 ÷ 2 =	½ of 2 =
14 − 8 =	12 ÷ 4 =	½ of 4 =
14 − 6 =	8 ÷ 4 =	½ of 6 =
14 − 9 =	4 ÷ 4 =	½ of 8 =
14 − 5 =	12 ÷ 3 =	½ of 10 =
14 − 10 =	3 ÷ 3 =	½ of 12 =

8 + = 14.	14 − = 5.	12 ÷ = 2.
9 + = 14.	14 ÷ = 7.	12 ÷ = 1.
10 + = 14.	7 × = 14.	½ of = 1.
14 − = 6.	12 ÷ = 6.	½ of = 6.
14 − = 8.	12 ÷ = 4.	½ of = 2.
14 − = 4.	12 ÷ = 3.	½ of = 5.
14 − = 10.	12 ÷ = 6.	½ of = 3.
14 − = 9.	12 ÷ = 12.	½ of = 4.

12 inches =	1 foot = inches.
6 inches =	½ of a foot = inches.

If I have eight apples, and you have six apples, how many apples must I give you that we may each have the same number of apples? If I give you one apple, how many will you have? How many shall I have? How many shall we have altogether? What two equal numbers have you just found make fourteen?

Seven days and seven days are how many days? Two weeks are how many days?

Two poles, each seven feet long, contain how many feet?

There are two groups of stars, called the Great Dipper and the Little Dipper, and each group has seven stars to form the dipper. How many stars are there in both dippers?

In winter the days are only about seven hours long. How many hours of daylight in two winter days?

Seven bright maples, and seven dark oaks, are how many trees?

Seven humble-bees, and seven morning-glories, are how many blossoms and bees together?

Two little girls, each with seven daisies, have how many blossoms? If seven of the blossoms fall to pieces, how many blossoms will remain?

If you find fourteen pretty shells on the beach, but seven fade and are no longer pretty, how many pretty shells will you have?

If seven and seven make fourteen, how many sevens make fourteen?

Express this fact on the board. ($2 \times 7 = 14$.)

If two sevens make fourteen, what is one-half of fourteen?

Express this fact on the board. ($\frac{1}{2}$ of 14 is 7.)

If fourteen is divided into groups of seven each, how many groups will be found?

Express this fact on the board. $(14 \div 7 = 2.)$

Give me a story for each fact you have expressed.

A boy who made brackets for sale had fourteen of one design. He sold seven of the brackets in one morning. How many had he left?

Nellie is fourteen years old. How old was she when she was only half as old as she is now?

If I can ride fourteen miles on my car-ticket, and I use half of my ticket, how many miles do I ride?

If there are fourteen weeks in one term of the school, how many weeks in one-half a term?

If there are fourteen chairs in a row, how many chairs in half of the row?

In fourteen days how many weeks?

How many seven-cent books can be bought for fourteen cents?

How many sticks, each seven feet long, can be cut from a pole fourteen feet long?

If it takes seven buttons for each jacket, how many jackets will fourteen buttons supply?

A lady who has fourteen geranium blossoms arranged them in groups of seven each. How many groups could she form?

Fill out the blanks in these expressions:

$7 + 7 =$	$10 + 4 =$	$14 \div \quad = 2.$
$2 \times 7 =$	$14 \div 2 =$	$8 + \quad = 14.$
$\frac{1}{2}$ of $14 =$	$7 \times 2 =$	$5 + \quad = 14.$
$14 \div 7 =$	$7 + \quad = 14.$	$4 + \quad = 14.$
$8 + 6 =$	$2 \times \quad = 14.$	$14 \div \quad = 7.$
$9 + 5 =$	$\frac{1}{2}$ of $\quad = 7.$	$7 \times \quad = 14.$
$6 + 8 =$	$14 \div \quad = 14.$	$9 + \quad = 14.$
$5 + 9 =$	$14 \div \quad = 1.$	$6 + \quad = 14.$

Exercise for Review.

If it is three times as far round a wheel as across it, how far is it round a wheel that is four feet across? that is three feet across?

If a circle is three inches across, how many inches is the circle round the outside?

If a circle is four inches across, how far is it round the outside of the circle?

If a circle is six inches round the outside, how far is it across the circle?

If a wheel is nine inches round the outside, how far is it across the wheel?

If a wheel is twelve inches round the outside, how far is it across the wheel?

How many inches long is a stick that is one-half of a foot?

My penholder is half of a foot and three inches long. How long is my penholder?

My pencil is one-fourth of a foot long. How many inches in length is my pencil?

If the cook uses one-fourth of a dozen eggs for a custard-pudding, how many eggs does she use?

If I distribute a dozen cookies equally among four children, how many cookies shall I give to each?

It takes a dozen months to make a year. How many months are there in one-fourth of a year?

The year is divided into four seasons. Each season has the same number of months. How many months has each season? Each season is what part of a year? How many autumn months are there? How many spring months?

If each letter requires a two-cent stamp, how much will it cost to send seven letters? Fourteen cents will buy how many two-cent stamps?

A large milk-pail holds a dozen quarts. How many two-quart pails of milk does it hold? How many three-quart pails of milk? How many four-quart pails of milk? How many six-quart pails of milk? If a six-quart pail of milk be emptied into it, how nearly full will it be? If a four-quart pail of milk be emptied into it, how nearly full will it be? If a three-quart pail of milk be emptied into it?

Fourteen ink-wells will supply how many inkstands, if each inkstand has two wells?

I have a square box whose edge is seven inches. How many inches is it half-way round the box? This box is twice as deep as it is broad. How deep is it?

Harry picked ten quarts of blueberries and four quarts of huckleberries. He sold half of his berries. How many quarts did he sell?

If note-paper is seven cents a quire, how much will two quires cost?

For fourteen cents, how many bunches of envelopes, at seven cents a bunch, can you buy?

How many lines, an inch apart, and each two inches long, can Mary make across a page, if the page is six inches across? If the page is nine inches across? If the page is twelve inches across?

The rails in a fence are three inches wide, and are placed three inches apart. How many rails are there in a foot of the fence? In two feet of the fence? In three feet of the fence? In seven feet of the fence?

If I draw as large a circle as I can in a square that is three inches on a side, how many inches across will the circle be? How many inches round the circle? How many more inches round the square than round the circle?

I bought nine yards of woollen goods, and five yards of silk goods. When I had used six yards of the material, how many yards had I left?

Into how many pieces will I cut a strip of paper, if I cut through it twice? If I cut it three times? If I cut it eight times? If I cut it twelve times? If I cut it thirteen times?

Into how many pieces does a man saw a stick of wood, if he saws through the stick twice? If he saws through the stick three times? If he saws through the stick once?

How many working days in a week and five days?

How many Sundays in thirteen days, beginning with Monday? How many Tuesdays? How many Fridays? How many Saturdays?

If I make a book by folding a piece of paper once, how many pages will the book have? If I fold the paper twice, how many pages will the book have? If I fold the paper three times, how many leaves will the book have?

See how many different arrangements you can make of the figures 1, 2, and 3.

Here is a button that is two inches round. I will chalk the edge, and you may roll it round once on the board. How long is the line it marks?

Here is a circle that is six inches round. Mark its edge with chalk, and roll it once round on the board. How long is the line which it marks?

Annie has a hoop that is five feet round. How many feet of ground will it go over in turning round twice?

A wheel that is two yards round will go over how many yards in turning round seven times? In turning round five times and half round again? In turning six and a half times round?

How long a time is it from twelve o'clock at noon to eight o'clock in the evening? From one o'clock to eight o'clock? From eight o'clock in the morning to six o'clock in the evening? From six o'clock in the morning to eight o'clock in the evening?

The short hand goes round the face of the clock only once while the long hand is going round twelve times. When the short hand has gone half-way round the clock, how many times has the long hand been round the clock? When the short hand has been a fourth round the clock, how many times has the long hand been round the clock? When the short hand has been a third round the clock, how many times has the long hand been round?

What time is it when the long hand points directly upward, and the short hand in the opposite direction? When it is five minutes past the hour, at what figure does the long hand point? When it is ten minutes past the hour? When it is five minutes of the hour?

The outside of a square flower-border was three feet on a side; the inside was two feet on a side. How much farther round was it on the outside than on the inside?

We will do some buying and selling to-day. George may be salesman, and set his own price on the goods he sells, but must not charge more than twelve cents for any article, as I shall not send any children to the store with more than twelve cents. Look over the goods and tell me what there is to sell. [Boxes of matches, thimbles (clay), marbles (clay), spools of thread (empty spools), lozenges (pasteboard disks), sticks of candy (colored sticks), pencils, papers of pins, papers of needles, pinballs, apples, pears, plums, grapes, peaches, oranges (clay), hat-pins (splints), pens, toy matches, toy tools (paper), postage-stamps, pictures, cards, sand-paper, blotting-paper, tissue-paper, narrow ribbon, narrow lace, newspapers, envelopes, star-books, pencil-tablets.]

Teacher. Nellie may run to the store and buy a thimble for herself and a paper of No. 10 needles for me. (She is given a ten-cent piece.)

Nellie at the store. I wish for a thimble for myself and a paper of No. 10 needles.

Salesman. Thimble two cents, needles five cents, and three cents are ten cents.

T. Tell me about your purchase, Nellie.

Frank may buy a small bottle of ink and a half dozen pens. (Frank is given a five-cent piece and two three-cent pieces.)

Frank. I wish for a bottle of ink and a half dozen pens.

S. Bottle of ink five cents, pens five cents, and one cent are eleven cents.

Harry may buy two sheets of coarse sand-paper and this morning's paper. (Harry is given a five-cent piece and two two-cent pieces.)

S. Two sheets of sand-paper four cents, and the newspaper three cents, and two cents are nine cents.

T. Annie may buy three two-cent postage-stamps and two sheets of white tissue-paper. (Annie is given four three-cent pieces.)

S. Three two-cent stamps six cents, two sheets of tissue-paper four cents, and two cents are twelve cents.

T. Cyrus may be salesman. Willie may buy a half dozen apples and three peaches. (Willie is given two threes and a five.)

S. Six apples three cents, three peaches six cents, and two cents are eleven cents.

T. Nettie may buy what she wishes to buy, and tell me about it afterwards. (Nettie is given some money.)

T. Henry may buy anything he wants, and tell me about it afterwards.

T. Joe may buy two sticks of candy and a watch. Tell me about the purchase when you return.

This exercise will require some tact on the teacher's part at first, that it may run smoothly; but after a few exercises the children will price the goods very fairly, and count out change in a business-

like way. A dollar in small pieces of money will be sufficient. The salesman needs a few cents to begin the sales. The rest of the money is spent by the customers. The exercise tests the children's power to apply their knowledge of number, acquaints them with prices of small articles, and gives practice in handling money.

Ten and one are how many?
Ten and two are how many?
Ten and three are how many?
Ten and four are how many?
Nine and five are how many?
Nine and four are how many?
Nine and three are how many?
Nine and two are how many?
Eight and how many are fourteen?
Eight and how many are twelve?
Eight and how many are ten?
Eight and how many are thirteen?
Eight and how many are eleven?
What number and seven are fourteen?
What number and four are eleven?
What number and seven are thirteen?
What number and five are twelve?
What number and seven are ten?

Express on the board the sum of any two numbers that together make fourteen; that together make ten; that together make thirteen; that together make eleven.

Fill out these blanks:

$2 \times 7 =$	$6 \times 2 =$	$12 \div 4 =$
$7 \times 2 =$	$12 \div 6 =$	$\frac{1}{2}$ of $12 =$
$14 \div 7 =$	$12 \div 2 =$	$\frac{1}{3}$ of $12 =$
$14 \div 2 =$	$3 \times 4 =$	$\frac{1}{4}$ of $12 =$
$\frac{1}{2}$ of $14 =$	$4 \times 3 =$	4 gills $=$
$2 \times 6 =$	$12 \div 3 =$	2 pints $=$

12 inches =	2 weeks =	½ of a pint =
12 things =	3 months =	½ of a quart =
7 days =	½ of a foot =	½ of a year =
12 months =	¼ of a foot =	½ of a dozen =
4 weeks =	⅛ of a foot =	½ of a week =

The Yard.

Here is the longest measure you have yet seen. Some of you are not as tall as this stick, when I stand it up. Who knows how long this stick is? It *is* a yard long. Who has seen a yard-stick at home? Who has seen anybody measure with such a stick? What did you see measured? Who has seen a yard-measure that was not a stick? You may each take one of these long strips of paper. How long do you think each is? Draw a line on the board a yard long. Measure off a yard on this edge of the table; on the edge of the platform; on the seat of the settee; on the back of the settee; on the edge of the blackboard; on the edge of the door; on the floor; on the window-frame; on the blind. What do you see in this room that you think is a yard long? What have you seen at home that is a yard long? Tell me to-morrow how wide each strip of carpet is that covers the floor of your room. Where have you seen a yard-stick used in measuring a great many things? What is bought by the yard?

Feet in a Yard.

Nettie may put her foot-rule on this yard-stick. Which is the longer measure?

Charley may put his foot-rule on the yard-stick, right against Nettie's. Are the two rules together as long as the yard-stick?

Mary may put her foot-rule right against Charley's. Are the three foot-rules together as long as the yard-stick?

Show me one foot on the yard-stick; another; another.

How many have you shown me? How many feet then make a yard?

Mabel, see if there are three feet in a yard.

I have some lines on the board. Find how long each is. (Three feet.)

Tell me in two ways how long the line is. (Three feet; a yard.)

This table is a yard wide. Find how many feet wide the table is.

The window-sill is a yard long. Find how many feet long the window-sill is.

This part of the blind is a yard high. How many feet high is it?

From this crack in the floor to this crack in the floor is a yard. How many feet between these two cracks?

If the carpet is a yard wide, how many feet wide is it?

If Susie is just a yard in height, how many feet tall is Susie?

The baby is two feet tall, and George is a yard in height. Which is the taller?

If this platform is twelve feet across, how many yards across is it?

If this table is six feet long, how many yards long is it?

If a room is nine feet high, how many yards high is it?

What part of a yard is twelve inches?

Write on the board: 3 feet = 1 yard.

CHAPTER XV.

THE NUMBER FIFTEEN.

§ 37. The Number Fifteen.

Show me fourteen with the tens and ones. Put one more with fourteen. How many more than ten have you now?

Ten and five are how many?

Put your splints back. Take fifteen again. How many tens have you taken? How many ones besides?

Write in words: One ten and five are fifteen.

Who can express this new number in figures?

For what does the figure **1** stand? the figure **5**?

Write all the numbers as far as fifteen that are expressed by two figures. How many tens in each of these numbers?

Which has the greatest number of ones besides the one ten?

Which has the least number of ones besides the one ten?

Fifteen is how many more than ten?

A ten-cent piece and a five-cent piece are how much money?

A ten-foot pole and a five-foot pole contain how many feet?

My ten fingers and five of your fingers are how many fingers?

If it is ten miles to my home, how many miles is it there and half-way back?

If a yard of cloth costs ten cents, what will a yard and a half cost?

If a hall is ten feet long and five feet wide, how many feet are in the length and the width together?

What two pieces of money make fifteen cents?

What two pieces of money make fifteen dollars?

If there are fifteen splints before me on the table, and I take five of the splints, how many splints remain?

If you have fifteen more days to go to school, how many days will you have to go after you have been five days?

Fifteen minus five are how many?

Express this fact on the board.

Who has an example for fifteen minus five?

Who can tell me what fifteen minus ten will leave?

If I have fifteen cents, and buy a ten-cent loaf of bread, how many cents shall I have left?

My pencil-tray is fifteen inches in length and width together. Its length is ten inches; what is its width?

If there are fifteen bananas in a bunch, and ten are sold, how many bananas are in the bunch?

Express fifteen minus ten on the board.

Show me fifteen, using a bundle of ten splints.

Now I want to find how many fives in fifteen.

In ten how many fives? and one more five will make how many fives?

In ten and five, then, how many fives?

In fifteen how many fives?

How many five-cent whistles can I buy for fifteen cents?

How many five-cent postage-stamps can I buy for fifteen cents?

If I have fifteen walnuts, to how many boys can I give five apiece?

If you arrange fifteen dots on the board in rows of five each, how many rows will you make?

Fifteen divided by five are how many?

Express this fact on the board a half dozen times.

Give an example for what you have expressed.

If fifteen divided by five are three, how many fives make fifteen?

Three five-dollar gold pieces are how many dollars?

Three five-cent pieces of money are how many cents?

Three five-cent pencils cost how many cents?

You are in school five days a week. How many days are you in school in three weeks?

A pansy-blossom has five petals. How many petals have three pansy-blossoms?

Three fives are how many?

Express this fact five times.

Give an example for what you have expressed.

If you divide fifteen into three equal parts, how many will there be in each part? What then is one-third of fifteen?

A farmer who had fifteen sheep, sold one-third of his flock. How many sheep did he sell?

There were fifteen children in a class, but one stormy day one-third of the class was absent. How many children were absent?

A farmer bought fifteen hens. One-third of the number was jet black. How many were black?

One-third of fifteen is how many?

Express this fact.

Give an example for what you have expressed.

Supply the term that is needed to complete these expressions:

$10 + 5 =$	$15 - 10 =$	$\frac{1}{3}$ of $15 =$
$15 - 5 =$	$15 \div 5 =$	$10 + \quad = 15.$
$5 + 10 =$	$3 \times 5 =$	$5 + \quad = 15.$

15 ÷	= 3.	+ 5 = 15.	− 10 = 5.
$\frac{1}{3}$ of	= 5.	× 5 = 15.	+ 10 = 15.
3 ×	= 15.	÷ 5 = 3.	+ 14 = 15.
15 −	= 5.	− 5 = 10.	+ 13 = 15.
15 −	= 10.	of 15 = 5.	+ 12 = 15.

James had ten nuts. Harry had five nuts. How many did both have?

James gave one of his nuts to Harry. How many nuts did each have then? How many did both have?

Nine nuts and six nuts are how many nuts?

If there are nine biscuits on one tea-plate and six on another, how many biscuits are on both plates?

If the distance is nine miles from one station to another, and six miles to the next station, how many miles is it from the first station to the third?

Give me an example for nine and six. Express the fact on the board.

Give an example for fifteen minus six.

Give an example for fifteen minus nine.

Nine and how many are fifteen?

Six and how many are fifteen?

Fifteen minus how many are nine?

Express this fact on the board.

Fifteen minus how many are six?

Express this fact on the board.

I want to find how many threes there are in fifteen. I wonder who will think it out. Think how many threes in nine, then think how many threes in six. How many threes are in nine and in six together? Then how many threes are in fifteen?

Fifteen divided by three are how many?

There are fifteen panes of glass in a window, three panes in each row. How many rows of panes in the window?

Fifteen cents will buy how many three-cent lead pencils? how many three-cent stamps? how many three-cent rubbers? how many three-cent newspapers?

Tell me a story for fifteen divided by three.

Express the fact on the board.

Since fifteen divided by three are five, how many threes make fifteen?

If I have five three-cent pieces of money, how much money have I?

A spider-wort blossom has three petals. How many petals have five spider-wort blossoms?

A lady is going to make some dresses for five little girls, and it will take three yards of cloth for each dress. How many yards of cloth will she need for all the dresses?

If it takes three yards of ribbon to trim each hat, how many yards of ribbon are needed to trim five hats?

Give an example for five threes are fifteen.

What five equal numbers make fifteen?

What three equal numbers make fifteen?

Five triangles have how many sides? how many corners?

How many toes has a dog on three feet?

How many feet in five yards of string?

How many ounces will three books weigh, each of which weighs five ounces? How many ounces will five books weigh, each of which weighs three ounces?

Supply the missing term in these expressions:

$9 + 6 =$	$3 \times 5 =$	$\div 3 = 5.$
$15 - 6 =$	$15 \div 5 =$	$- 9 = 6.$
$15 - 9 =$	$\frac{1}{3}$ of $15 =$	$- 6 = 9.$
$6 + 9 =$	$15 - 10 =$	$10 + \quad = 15.$
$15 \div 3 =$	$\times 3 = 15.$	$3 \times \quad = 15.$
$5 \times 3 =$	$+ 9 = 15.$	$15 \div \quad = 3.$
$10 + 5 =$	$+ 6 = 15.$	$\frac{1}{3}$ of $\quad = 5.$

The boys chose sides in playing ball. If there were nine boys on one side and six boys on the other side, how many boys were playing? If one from the larger side should go to the other side, how many boys would there be on each side? and how many in all?

Eight and seven are how many?

Who thinks of an example for this fact?

Express the fact on the board.

What two numbers make fifteen, one of which is ten? one of which is nine? one of which is eight? one of which is seven? one of which is six? one of which is five?

What three equal numbers make fifteen?

What five equal numbers make fifteen?

Express the examples I give you on the board:

[It is expected that the pupil will express the operation and answer by means of figures and signs of operations.]

There were fifteen chickens roosting on a fence, and nine flew down. How many were left on the fence?

There were fifteen jelly-fish on the beach, but ten of them melted in the sun. How many were left?

A star-fish has five arms or rays. How many rays have three star-fish?

A clover leaf has three parts. How many parts have five clover leaves?

When peaches are three cents apiece, how many can be bought for fifteen cents?

If I have fifteen cents in three equal pieces of money, what is each piece of money?

If I have fifteen cents in five equal pieces of money, what is each piece of money?

A fence is seven feet long one side of the gate and one foot longer on the other side of the gate. How long is the fence besides the gate?

Four and five and six are how many?
You may express this on the board.
Seven and three and five are how many?
Express this on the board.
Five and three and seven are how many?
Express this on the board.
I will express these examples a new way.

[Let teacher express in a vertical column with the answer underneath.]

Express four and two and five the new way.
Express five and six and two.
Express three and four and five and two.
Express one, two, three, four, and five.
Express three, two, and ten.
Express one, two, and twelve.

Take this number-work

$10 + 5 =$	$7 + 7 =$	$4 + 3 =$	$15 \div 3 =$
$10 + 4 =$	$7 + 2 =$	$2 \times 2 =$	$15 \div 5 =$
$10 + 3 =$	$7 + 6 =$	$2 \times 7 =$	$14 \div 2 =$
$10 + 2 =$	$7 + 3 =$	$2 \times 3 =$	$14 \div 7 =$
$10 + 1 =$	$7 + 5 =$	$2 \times 6 =$	$12 \div 2 =$
$10 + 0 =$	$7 + 4 =$	$2 \times 4 =$	$12 \div 3 =$
$9 + 6 =$	$6 + 5 =$	$2 \times 5 =$	$12 \div 4 =$
$9 + 2 =$	$6 + 2 =$	$3 \times 2 =$	$12 \div 6 =$
$9 + 5 =$	$6 + 4 =$	$3 \times 3 =$	$10 \div 2 =$
$9 + 3 =$	$6 + 3 =$	$3 \times 4 =$	$10 \div 5 =$
$9 + 4 =$	$6 + 6 =$	$3 \times 5 =$	$9 \div 3 =$
$8 + 2 =$	$5 + 5 =$	$4 \times 2 =$	$8 \div 2 =$
$8 + 7 =$	$5 + 2 =$	$4 \times 3 =$	$8 \div 4 =$
$8 + 3 =$	$5 + 4 =$	$5 \times 2 =$	$6 \div 2 =$
$8 + 6 =$	$5 + 3 =$	$5 \times 3 =$	$6 \div 3 =$
$8 + 4 =$	$4 + 4 =$	$6 \times 2 =$	$\frac{1}{2}$ of $14 =$
$8 + 5 =$	$4 + 2 =$	$7 \times 2 =$	$\frac{1}{2}$ of $12 =$

½ of 10 =	¼ of 1 =	2 pints =		2	4
½ of 8 =	¼ of 0 =	12 inches =		4	3
½ of 6 =	⅛ of 8 =	3 feet =		3	2
½ of 4 =	⅛ of 15 =	12 things =		4	1
½ of 2 =	⅛ of 12 =			—	—
½ of 1 =	⅛ of 9 =				
½ of 0 =	⅛ of 6 =	3	1	2	2
¼ of 12 =	⅛ of 3 =	2	2	5	3
¼ of 8 =	4 gills =	4	3	3	4
¼ of 4 =		6	4	4	5
		—	—	—	—

The Gallon.

Who has heard any one speak of a *gallon* of molasses? a gallon of oil? a gallon of syrup?

I hold in my hand a measure that holds just a gallon.

Who has seen such a measure before?

Who has anything at home that holds just a gallon?

Who has heard of a gallon-jug? a gallon-can?

Which holds more, this quart or this gallon measure?

You may find how many quarts a gallon will hold.

How many quarts in a gallon?

In a gallon of vinegar, how many quarts of vinegar?

If I buy a gallon of molasses, how many quarts do I buy?

In half a gallon of oil, how many quarts of oil?

In a half-gallon of ink, how many quarts of ink?

How many two-quart pails are required to hold a gallon?

How many pint pails are required to hold a gallon?

If a pint of water weighs one pound, how much will a gallon of water weigh?

How many quarts make a gallon?

Write on the board: 4 quarts = 1 gallon.

CHAPTER XVI.

THE NUMBER SIXTEEN.

§ 38. The Number Sixteen.

Take ten splints. Take six more splints. What number of splints have you?

Ten and six are how many?

Who can write the word *sixteen?*

Who can express sixteen in figures?

How many tens in sixteen? How many ones beside?

Which figure stands for the one ten?

Which figure shows that there are six ones besides the ten in sixteen?

Express all the numbers that contain only one ten.

Which is the largest number you have expressed? Which is the smallest?

A ten-cent piece of money and two three-cent pieces of money are how much money?

A ten-cent piece of money and three two-cent pieces of money are how much money?

Two five-cent pieces of money and two three-cent pieces of money are how much money?

If one keg holds ten gallons of cider-apple sauce, and another keg holds six gallons, how many gallons will both kegs hold together?

There were sixteen boys in a class, but six were promoted to another grade. How many boys were left in the class?

There were sixteen swallows' nests in a bank, but the bank caved in and destroyed six nests. How many nests were then in the bank?

Sixteen boys were playing ball, but ten ran home to dinner. How many boys were then playing ball?

Sixteen crows alighted in a corn-field. Two of them were frightened away by the flapping garments of an old scare-crow, but the rest did not care a fig. How many stayed and ate the corn?

Ten and how many are sixteen?

Express this fact on the board.

Sixteen minus ten are how many?

Express this fact on the board.

Sixteen minus what number are ten?

Express this fact on the board.

If you take a splint from the bundle of tens and put it with six, what two numbers will you then have? Ten and six are how many? Nine and seven are how many?

Give an example for nine and seven.

Express this fact on the board.

Give an example for sixteen minus nine.

Express this fact on the board.

Give an example for sixteen minus seven.

Express this fact on the board.

If Henry finds nine eggs in one nest and seven in another nest, how many eggs does he find in all?

In two pods there were sixteen peas. If there were nine peas in one pod, how many peas were in the other pod?

Johnnie was peddling chestnuts. He started out with sixteen quarts, and sold nine quarts within half an hour. How many quarts had he then to sell?

An old ladder lay in the loft with several rounds broken out. It had sixteen rounds when it was new; now only seven remained. How many were broken?

Express on the board: Nine and seven are sixteen.

If you take one from nine, what number will remain?

Express eight below nine.

Now put the number you take from nine with seven, and what number will you have?

Express this eight below seven.

What two numbers have you made by taking one from nine and adding it to seven?

What must be the sum of these two numbers?

Express this fact.

If eight and eight are sixteen, how many eights are in sixteen?

Express the fact: Sixteen divided by eight are two.

If there are two eights in sixteen, how many eights make sixteen?

Express the fact: Two eights are sixteen.

What two equal numbers have you found then in sixteen? What part of sixteen must each of the numbers be?

What then *is* one-half of sixteen?

Express the fact: One-half of sixteen is eight.

If *two* eights are sixteen, what will remain if *one* eight is taken away?

Sixteen minus eight then are how many?

Express this fact.

Read the facts you have expressed.

Illustrate each fact by drawings on the board.

A flock of sheep was going along the road. Eight were marked with black spots and eight were white. How many sheep were in the flock?

Sixteen fruit trees blossomed in our orchard, but only eight bore fruit. How many did not bear fruit?

In a horse-car there were eight persons on each side. How many persons were in the car?

How many eight-cent spools of silk can I buy for sixteen cents?

Two boys had sixteen small pears which they divided equally between themselves. How many pears had each?

If I ride sixteen miles, but you ride only one-half as far, how far do you ride?

Read what I have expressed ($8 + 8 = 16$).

What two equal numbers make eight?

Express "four and four" beneath the first eight; beneath the second eight.

Read each eight in fours.

If eight and eight are sixteen, what is the sum of four and four and four and four? How many fours? Four fours then are how many?

Express: Four fours are sixteen.

If there are four panes of glass in each window, how many panes of glass are in four windows?

Four chairs have how many legs together?

Four squares have how many sides all together? have how many corners?

If one quart of milk costs four cents, what will a gallon of milk cost?

If four fours make sixteen, how many fours can be taken from sixteen? Sixteen divided by four are how many then?

Express this fact.

Sixteen quarts of milk will fill how many gallon-cans?

Sixteen cents will buy how many yards of ribbon at four cents a yard?

Sixteen horses will supply how many four-horse coaches?

Into what four equal numbers can sixteen be divided? What part of sixteen is each of the numbers?

What then is one-fourth of sixteen? Express this fact.

There were sixteen empty cars on a freight train when it started from the station, but a quarter of them were switched off at the next station. How many cars were switched off?

A summer day is sixteen hours long. How long is a fourth of the day?

This string is five yards and a foot long. How many feet long is one-fourth of the string?

Edwin had sixteen hens but he sold four hens. What part of his whole number of hens did he sell?

Supply the missing term in these expressions:

$8 + 8 =$	$\frac{1}{4}$ of $16 =$		4 gills	=
$16 - 8 =$	$16 - \quad = 10.$		2 pints	=
$2 \times 8 =$	$16 - \quad = 9.$		4 quarts	=
$16 \div 8 =$	$16 - \quad = 8.$		12 inches	=
$\frac{1}{2}$ of $16 =$	$10 + \quad = 16.$		3 feet	=
$10 + 6 =$	$9 + \quad = 16.$		12 things	=
$16 - 10 =$	$8 + \quad = 16.$			
$16 - 6 =$	$2 \times \quad = 16.$		3	2
$9 + 7 =$	$4 \times \quad = 16.$		4	4
$16 - 9 =$	$16 \div \quad = 2.$		2	3
$16 - 7 =$	$16 \div \quad = 4.$		3	3
$4 \times 4 =$	$\frac{1}{2}$ of $\quad = 8.$		4	3
$16 \div 4 =$	$\frac{1}{4}$ of $\quad = 4.$		—	—

Read what I have written ($8 + 8 = 16$).

How many twos make eight? What then is just the same as eight? (4×2.)

Express two and two and two and two under each eight. Read, Eight and eight are sixteen, by twos ($2 + 2 + 2 + 2 + 2 + 2 + 2 + 2 = 16$). How many twos? How many twos make sixteen then?

Express: Eight twos are sixteen.

If eight twos make sixteen, into how many twos may sixteen be divided?

Express: Sixteen divided by two are eight.

How many pairs of gloves in sixteen gloves?

Ned has sixteen cents in two-cent pieces. How many two-cent pieces has he?

Eight spans of horses are how many horses?

Eight yokes of oxen are how many oxen?

Eight birds have how many wings?

What eight equal numbers make sixteen? What part of sixteen is each number? What number then is one-eighth of sixteen?

Express: One-eighth of sixteen is two.

We have a measure which holds sixteen quarts. If it is an eighth full how many quarts are in the measure?

One side of a long and narrow bench is sixteen feet long; the shorter side is two feet long. What part of the length is the width?

How many strips of carpeting two feet wide will it take to go across a room sixteen feet long? What part of the length of the room is each strip of carpeting?

Fred has ten watermelons and six muskmelons in his little garden. How many melons has he all together?

There are nine buttons on one of Ned's boots, but only seven on the other boot. How many buttons on both boots?

Annie is ripping buttons off of old dresses. She has ripped eight off of one dress and eight off of another dress. How many buttons has she ripped off all together?

There were sixteen boys with soldier caps. Six caps had silver bands and the rest had red bands. How many had red bands?

At a summer hotel there were sixteen rabbits playing on the lawn. Seven were white and the rest gray. How many were gray?

If Jack has sixteen errands to do and does eight errands, how many more errands has he to do? When he has done nine errands, how many has he still to do?

James picked sixteen quarts of cranberries. He put ten quarts in one basket, and the rest in another basket. How many quarts of cranberries were in the second basket?

If it costs two cents to send an ordinary letter through the mail, how many cents will it cost to send eight letters?

How many quarts are there in four gallons?

How many gills are there in four pints?

If a paper of needles costs eight cents, what will two papers of needles cost?

How many two-cent pencils can I buy for sixteen cents? How many two-cent stamps?

When lemons are four cents apiece, how many lemons can be bought for sixteen cents?

When slate pencils can be bought for eight cents a dozen, how many dozen can be bought for sixteen cents?

Jennie has sixteen peanuts but she gave half of what she had to her sister. How many did she give her sister?

A man started one morning to ride sixteen miles. When he had gone one-fourth of the distance, he found the horse had lost a shoe and could go no farther on the rough road, so he turned back. How far had he gone?

A lady made sixteen turnovers one Thanksgiving for her eight little nieces. How many turnovers could each have?

Give me a number that you can take from sixteen. (Eight.) Sixteen minus eight are how many? I will express this on the board.

$$\begin{array}{r} 16 \\ -\ 8 \\ \hline 8 \end{array}$$

Give another number that you can take from sixteen, and tell me the result. (Nine from sixteen are seven.) I will express this on the board.

$$\begin{array}{r} 16 \\ -9 \\ \hline 7 \end{array}$$

You may express in the same way: Sixteen minus six; fourteen minus seven; thirteen minus five; twelve minus six; eleven minus four; ten minus six.

Read what I express:

15	12	16	15	14	11
−10	−10	−6	−5	−10	−10
5	2	10	10	4	1
16	15	13	10	16	15
−7	−6	−10	−10	−8	−7
9	9	3	0	8	8

Complete these expressions:

16 ÷ 2 =	16 ÷ 8 =	÷ 4 = 4.
8 × 2 =	2 × 8 =	× 4 = 16.
$\frac{1}{8}$ of 16 =	$\frac{1}{2}$ of 16 =	of 16 = 4.
16 ÷ 4 =	÷ 8 = 2.	÷ 2 = 8.
4 × 4 =	× 8 = 16.	× 2 = 16.
$\frac{1}{4}$ of 16 =	of 16 = 8.	of 16 = 2.

16	15	14	13	16	15
−8	−8	−8	−8	−9	−9
14	13	16	15	14	13
−9	−9	−7	−7	−7	−7
13	16	15	14	13	16
−10	−10	−10	−10	−3	−6

Exercise for Review.

In two months from to-day will be New Year's day. What day of the month is it? What month is it? How many months have passed since last New Year's day?

If spring and summer of this year are gone, how many months remain to the year? If one-half of this year is gone, how many months remain to the year? When one-fourth of a year is gone, how many months are gone? How many months remain?

How many weeks in a month and fourteen days?

In twelve quarter-dollars how many dollars?

In sixteen quarter-dollars how many dollars?

In sixteen half-dollars how many dollars?

If gingham is sixteen cents a yard, what will a half-yard cost? What will a quarter of a yard cost? What will one eighth of a yard cost?

Sixteen pint bottles will hold how many quarts of wine?

If James is fourteen years old, how many years ago was he one-half as old as he is now?

I have a ten-cent piece. What other two pieces of money may I have to make fourteen cents?

If I write eight letters to-day and six to-morrow, how many letters shall I write?

Mary has nine figs and Susie has five figs. How many figs have they together?

If Mary eats one of her figs and Susie gets another fig, how many will both have?

Fourteen equals how many twos?

Fourteen equals how many sevens?

If this room is five yards long, how many feet long is the room?

A stick that is fifteen feet long can be cut into how many yard-sticks?

When John measured the platform he found it would contain his foot-rule fifteen times. How many yards long is the platform?

Fifteen is how many threes?

If you are in school five hours a day, how many hours are you in school three days?

Nellie drew a triangle which was five inches on each side. How far was it round the triangle?

I saw a garden plot in the shape of a triangle that was five feet on a side. How far was it round the plot?

If plants were set around the outside a foot apart, how many plants were set around the bed? Draw the plot and see if you are right.

A gardener had six Scotch roses and half as many more English roses. How many roses had he in all?

If it takes six yards of dress goods to make Fanny a dress, and half as many more yards to make her mother a dress, how many yards are required for both dresses?

How many strokes will the clock give in striking seven and eight?

Harry went to visit his cousin for a week but stayed eight days more than a week. How many days did he stay all together?

A round block is fifteen inches round and one-third as many inches across. How many inches across is the block?

My paper-weight is fifteen inches round and one-third as many inches across. How many inches across is the weight?

This stick is a foot and three inches in length. How many inches long is the stick?

Annie is five years old and her brother twice as old. What is the sum of their ages?

Henry is fifteen years old and his brother five years old. What is the difference of their ages?

A cask has fifteen gallons of apple sauce in it. After seven gallons are dipped out how many gallons will remain in the cask?

Count by threes to fifteen.

Count by fives to fifteen.

What three equal numbers make fifteen?

What five equal numbers make fifteen?

Harry had six words written on one side of his slate, and one more than six words written on the other side of his slate. How many words had he written in all?

Thirteen is how many more than a dozen?

I have a ten-cent piece. Tell me what other piece of money I must have to make thirteen cents.

If I pick six quarts and a half of raspberries how many pints do I pick?

A man bought eight pounds of brown sugar and five pounds of white sugar. How many pounds of sugar did he buy?

There are eight cows and five calves in a pasture. How many cattle are in the pasture?

Make up an example for what I express on the board:

$8+5$	$9+4$	$\times 7=14.$
$9+3$	$9+5$	$\times 3=15.$
$10+4$	$9+6$	$\times 4=16.$
$7+5$	$9+7$	$+10=16.$
$6+5$	$6+7$	$+7=12.$

3	1	4	2
4	2	5	5
6	7	3	4
3	5	4	3
—	—	—	—

16	15	14	13
−6	−5	−10	−10
15	15	16	16
−7	−13	−14	−12

Express on the board:

One-half of two.	One-third of fifteen.
One-half of six.	One-third of twelve.
One-half of ten.	One-third of six.
One-half of fourteen.	One-fourth of four.
One-half of sixteen.	One-fourth of twelve.
One-half of twelve.	One-fourth of eight.
One-half of eight.	One-fourth of sixteen.
One-half of four.	One-eighth of sixteen.
One-third of three.	One-eighth of eight.
One-third of nine.	One-half of one.

Fill out:

8 + 4 =	+ 8 = 16.
9 + 3 =	+ 8 = 14.
10 + 2 =	+ 8 = 12.
11 + 1 =	+ 8 = 10.
7 + 5 =	− 8 = 8.
6 + 6 =	− 8 = 6.
7 + 6 =	− 8 = 4.
8 + 5 =	− 8 = 2.

CHAPTER XVII.

THE NUMBER SEVENTEEN.

§ 39. The Number Seventeen.

Take a bundle of ten splints. Take seven more splints. Who knows how many ten and seven are?

Express on the board: Ten and seven are seventeen.

Give an example for ten and seven.

Seventeen minus seven are how many?

Seventeen minus ten are how many?

Express on the board all the facts in seventeen that you know.

If there were ten géranium blossoms on a plant yesterday, and now there are seven more blossoms, how many blossoms are on my plant?

If one of yesterday's blossoms drop off, how many old blossoms will remain? If one more new blossom comes, how many new blossoms will there be? If one blossom dies and one new blossom comes, are there as many now as before? Nine and eight are how many then?

Three three-cent pieces and four two-cent pieces of money are how much money?

Name two numbers one of which is one more than the other that together make seventeen.

Amy is seventeen years old. How old was she seven years ago? How old was she ten years ago? nine years ago? eight years ago?

Ned's language-book and writing-book together cost seventeen cents. If his language-book cost nine cents, what did his writing-book cost?

If a man's coat cost seventeen dollars, and a boy's jacket cost eight dollars, how much more did the coat cost than the jacket?

Two five-cent pieces of money, two three-cent pieces, and one cent are how much money?

Fill out the blanks:

$10 + 7 =$	17	17
$17 - 10 =$	-10	-9
$9 + 8 =$		
$17 - 7 =$	17	17
$17 - 9 =$	-8	-7
$17 - 8 =$		
$17 \times 1 =$	17	17
$17 \div 1 =$	-5	-6

One-Sixth.

Into how many pieces have I divided this circle? (Six pieces.) Into what kind of pieces? (Equal.) Into what then have I divided this circle?

Into what have I divided this ring? (Six equal pieces.)

Into what have I divided this apple? this leaf of paper?

Into how many equal parts have I divided this line?

Each part of the line is one-sixth of the whole line. Show me one-sixth of the line.

Each one of the six equal parts of the apple is one-sixth of the apple. Show me one-sixth of the apple.

Show me one-sixth of the ring I divided.

How many such parts will it take to make the ring?

Show me one-sixth of the circle I divided.

How many such parts will it take to make the circle?

Draw a triangle. Divide the base into halves, and divide each half into thirds. Into how many equal parts is the base divided? What part of the whole base is each of the parts into which it is divided? Write "s" under each sixth. How many times have you written "s"?

Connect the vertex with each point of division in the base. How many triangles have you made? What part of the large triangle is each small triangle?

See if you can divide a circle into sixths. This rectangle into sixths.

Show me what you think to be a sixth of the edge of this table; of the other edge of the table.

What part of this pencil is one-sixth of the whole pencil?

Call these six blocks a pie. Divide this pie into six equal pieces. What part of the whole pie is each piece?

Call these six blocks an orange that is split open on one side so that it lies nearly flat. Divide the orange into sixths.

Take twelve blocks. Divide the number into six equal groups. What part of twelve is each group? How many in each group?

What number then is one-sixth of twelve? How many such numbers will it take to make twelve?

If you eat one-sixth of a dozen eggs, how many eggs will you eat?

Into how many sixths can you cut a pie? into how many fourths? into how many thirds? into how many halves?

Which is larger, a half or a sixth of the same pie? a half or a fourth of the same pie?

Express: One-sixth of twelve is two. One-sixth of six is one.

CHAPTER XVIII.

THE NUMBER EIGHTEEN.

§ 40. The Number Eighteen.

Who knows how many ten and eight are? Find out with the splints if you do not know.

Express the fact on the board.

Give an example for the fact.

If you take one from the ten and put it with eight, what two equal numbers will you have? What is the sum of nine and nine?

Give examples for nine and nine.

Since nine and nine make eighteen, how many nines make eighteen?

Express: Two nines are eighteen.

If each ball club has nine boys, how many boys will it take for two ball clubs?

If there are nine rings on one curtain rod, how many are there on two curtain rods?

If two nines make eighteen, how many nines will you find in eighteen?

Express: Eighteen divided by nine are two.

I ironed eighteen handkerchiefs, and laid them in piles with nine in each pile. How many piles did I make?

When calico is nine cents a yard, how many yards can be bought for eighteen cents?

Into what two equal numbers may eighteen be divided?

What part of eighteen is each number? What then is one-half of eighteen?

We had eighteen young turkeys, but half of them strayed away in the wet grass and died. How many had we then?

John picked eighteen quarts of cranberries, and Harry picked half as many quarts. How many quarts of cranberries did Harry pick?

Who knows how many sixes there are in eighteen? Find out with the splints if you are not sure.

Express this fact on the board.

If there are eighteen pencils in a box, done up in bundles of six each, how many bundles are there in the box?

If there are eighteen pear trees in an orchard, arranged in rows of six each, how many rows of pear trees are there?

A man who is packing eggs in a box puts a half dozen eggs in each layer. How many layers will eighteen eggs make?

Give me an example for eighteen divided by six.

If you find three sixes in eighteen, how many sixes must you take to make eighteen?

Express: Three sixes are eighteen.

If you buy a half dozen oranges to-day, to-morrow, and the next day, how many oranges will you buy in all?

If there are half a dozen pies on each shelf, how many pies are on three shelves? How many pies are there on two shelves? What part of a dozen on the next shelf?

How many did you say there were on the three shelves? Then one dozen and a half are how many?

A dozen and a half apples are how many apples? A dozen and a half eggs are how many eggs?

What three equal numbers make eighteen?

What part of eighteen is each of the three equal numbers which make eighteen?

What part of eighteen is six?

Express on the board: One-third of eighteen is six.

Give an example for this fact.

Express on the board: Six and six and six are eighteen.

What two equal numbers make six?

Write "three and three" under each six.

Read six and six and six are eighteen, in threes.

How many threes are eighteen?

Express: Six threes are eighteen.

Give an example for this fact.

If you have six three-cent pieces, how much money have you?

If you buy a half dozen three-cent lead pencils, how much money will you pay?

Six triangles have how many sides? have how many corners?

If you put a dot in each corner of six triangles, how many dots will you make?

If it takes six threes to make eighteen, how many threes can you find in eighteen?

Express this fact on the board.

Eighteen cents will buy how many three-cent pencils? how many three-cent books? how many peaches at three cents each?

Give an example for eighteen divided by three.

What six equal numbers make eighteen?

What part of eighteen is each of these numbers? What part then of eighteen is three?

Express: One-sixth of eighteen is three.

If I distribute eighteen pencils equally among six children, how many pencils do I give each child?

A lady cut a cake into eighteen equal pieces. If a sixth of the cake was eaten, how many pieces were eaten?

If a large watermelon was cut into eighteen pieces, and I

put a sixth of the number of pieces on a separate plate, how many pieces did I put on the plate?

Give an example for one-sixth of eighteen.

Who can tell how many twos in eighteen? Find out with the splints if you do not know.

Express the fact on the board.

How many two-cent stamps can I buy for eighteen cents?

How many pairs of gloves are there in eighteen gloves?

How many quarts are there in eighteen pints?

Eighteen shafts will supply how many wagons?

If there are nine twos in eighteen, how many two-cent pieces will it take to equal eighteen cents?

How many knobs are required for nine doors?

How many eyes have nine boys?

Nine oysters have how many shells?

Nine sheets of paper have how many leaves?

Who has an example for nine twos are eighteen?

Express on the board all the facts in eighteen. Who has eighteen facts expressed?

Illustrate with drawings half of the facts you have expressed.

Tell me about your drawings.

Illustrate the examples I give you.

One man rowed down the river nine miles, and another man starting at the same place rowed up the river nine miles.

There were three rows of pies in the pantry, six in each row.

There were enough quart-bottles on a shelf to hold eighteen pints.

There were enough three-quart pickle jars to hold eighteen quarts of pickles.

There were enough pans in the dairy to hold eighteen quarts of milk if six quarts were put in each pan.

Express the examples I give you, and also the answer. (The pupil understands by this direction that he is to express the operation which the conditions of each problem require, and the result of the operation.)

There were ten English sparrows drinking out of the basin of a fountain, and eight more on the ground around the fountain. How many sparrows were there in all? ($10 + 8 = 18$.)

If one base-ball nine plays against another base-ball nine, how many boys are playing? ($9 + 9 = 18$.)

I bought three quarts of hulled corn at six cents a quart. What did I pay? ($3 \times 6 = 18$.)

I bought six hat pins at three cents apiece. What did I pay? ($6 \times 3 = 18$.)

I had eighteen curtain rings, and it took two rings for each curtain loop. How many loops could I supply with rings? ($18 \div 2 = 9$.)

There were eighteen feet in a chain. How many yards were there in the chain? ($18 \div 3 = 6$.)

If it takes six strips of carpeting, each strip a yard wide, to go across my room, how many feet long is my room? ($6 \times 3 = 18$.)

This morning the cook had a dozen and a half eggs. She used a third of them in making a pudding for dinner. How many eggs did she use? ($\frac{1}{3}$ of $18 = 6$.)

A boy who had eighteen rabbits sold half of them. How many rabbits did he sell? ($\frac{1}{2}$ of $18 = 9$.)

It took eighteen yards of ribbon to trim six hats. How many yards of ribbon were used for each hat? ($\frac{1}{6}$ of $18 = 3$.)

I distributed eighteen nuts equally between two boys. How many nuts did I give to each boy? ($\frac{1}{2}$ of $18 = 9$.)

Three boys together earned eighteen cents, and all received an equal amount of money. How much did each receive? ($\frac{1}{3}$ of $18 = 6$.)

Supply the missing term in these expressions:

$18 \div 2 =$	$18 - \quad = 10.$
$18 \div 3 =$	$18 - \quad = 8.$
$18 \div 6 =$	$18 - \quad = 9.$
$18 \div 9 =$	$18 - \quad = 12.$
$\frac{1}{2}$ of $18 =$	$9 + \quad = 18.$
$\frac{1}{3}$ of $18 =$	$10 + \quad = 18.$
$\frac{1}{6}$ of $18 =$	$8 + \quad = 18.$
$9 \times 2 =$	$12 + \quad = 18.$
$6 \times 3 =$	$9 \times \quad = 18.$
$2 \times 9 =$	$2 \times \quad = 18.$
$3 \times 6 =$	$6 \times \quad = 18.$
$10 + 8 =$	$3 \times \quad = 18.$
$9 + 9 =$	$18 \div \quad = 9.$
$18 - 10 =$	$18 \div \quad = 6.$
$18 - 9 =$	$18 \div \quad = 3.$
$18 - 8 =$	$18 \div \quad = 2.$
$8 + 10 =$	$18 \div \quad = 18.$
$18 \div 18 =$	$\frac{1}{2}$ of $\quad = 9.$
$9 + 9 =$	$\frac{1}{3}$ of $\quad = 6.$
$18 - 6 =$	$\frac{1}{6}$ of $\quad = 3.$
$18 - 18 =$	$6 + \quad = 18.$
$12 + 6 =$	$18 \times \quad = 18.$

18	18	18	18
−8	−13	−14	−5
18	18	18	18
−10	−11	−17	−2
18	18	18	18
−12	−7	−16	−4
18	18	18	18
−6	−9	−15	−3

CHAPTER XIX.

THE NUMBER NINETEEN.

§ 41. The Number Nineteen.

Show me a bundle of ten splints, and nine single splints. Who knows what number he has shown me?

Express the number on the board.

A ten-cent piece and three three-cent pieces of money will make how much money?

Two five-cent pieces of money and three three-cent pieces of money will make how much money?

Give examples for ten and nine.

Express just the sum of ten and nine on the board. (19.)

Express underneath it the sum of ten and eight.

Express the sum of ten and seven; of ten and six; of ten and five; of ten and four; of ten and three; of ten and two; of ten and one; of ten and none.

How many tens has each one of these numbers?

Which number has the most ones besides the one ten? Which number has eight ones beside the one ten? Which number has seven ones besides the one ten?

Show me the column of tens; the column of ones.

What is the difference between none and nine? between ten and nineteen? between one and nine? between eleven and nineteen? between four and nine? between fourteen and nineteen? between five and eight? between fifteen and eighteen? between fourteen and eighteen? between fifteen and nineteen? between thirteen and sixteen? between twelve and nineteen?

Express: Two eights are sixteen.
Three fives are fifteen.
Four threes are twelve.
Five threes are fifteen.
Six threes are eighteen.

I will express what you have written in this way:

8	5	3	3	3
2	3	4	5	6
—	—	—	—	—
16	15	12	15	18

Express in this new way:

Three fours are twelve.
Two nines are eighteen.
Four fours are sixteen.
Three sixes are eighteen.
Nine twos are eighteen.
Two sixes are twelve.

Exercise for Review.

How many strokes will a clock give in striking five and six? in striking six and seven? in striking seven and eight?

How many strokes will a clock give between half-past three and half-past six?

If the face of a clock is a foot round, how many inches does the point of the long hand move over in going from twelve to six? in going from twelve to twelve? in going once and a half round the clock?

How long a time will it take the long hand to move over eighteen inches? How long will it take the short hand to move over eighteen inches?

If that blackboard is eighteen feet in length, how many yards long is the blackboard?

If this table is six feet on one side, and three feet on the other side, how many yards is it all round the table?

This stick is a foot and a half long. How many inches in length is the stick?

The distance from the floor to the first round of a chair is half a foot; from the first round to the next round is half a foot, and from the second round to the seat of the chair half a foot. How many inches high is the seat of the chair?

If wood is sawed into sticks a foot and a half long, how long must the wood be to make two sticks? What part of a yard?

If a shed is eighteen feet from the roof to the ground, how many yards is the roof from the ground?

A yoke of oxen will require how many shoes?

Four horses will require how many shoes?

Sixteen quarts of molasses will fill how many gallon jugs?

Eighteen half-pint jelly glasses will hold how many pints of jelly? how many quarts of jelly? How many more glasses will it take to hold five quarts of jelly?

A week and ten more days are how many days?

I bought two bottles of ink. For one bottle I paid nine cents, and for the other bottle one cent less. How much did I pay for both bottles of ink?

Eighteen equals how many twos? how many threes? how many sixes? how many nines?

What is one of the nine equal numbers that make eighteen? one of the six equal numbers? one of the three equal numbers? one of the two equal numbers?

Sixteen equals how many twos? how many fours? how many eights?

Fifteen equals how many threes? how many fives?

Fourteen equals how many twos? how many sevens?

Twelve equals how many twos? how many threes? how many fours? how many sixes?

CHAPTER XX.

TENS.

§ 42. Tens.

Take two tens. Who knows how many two tens are?

Take three tens. How many are three tens?

Take four tens. How many are four tens?

Show me fifty. How many tens make fifty?

Show me sixty. How many tens make sixty?

Read the number I show you. (Seventy. Forty. Eighty. Thirty. Ninety.)

In thirty, how many tens? In fifty, how many tens? In sixty, how many tens?

Nine tens are how many? Eight tens are how many? Four tens are how many? Six tens are how many?

Show me with bundles of tens the answers to the questions I ask you:

I have two ten-cent pieces in my hand. How much money have I?

Jennie bought four yards of calico at ten cents a yard. How much did she pay for the calico?

James bought five pounds of sugar at ten cents a pound. How much did he pay for the sugar?

There are eight rows of trees in an orchard, and ten trees in each row. How many trees are in the orchard?

If a baker sells a loaf of bread for ten cents, how much will he receive for nine loaves of bread?

Express the number ten on the board.

Who can express two tens or twenty? three tens or thirty? four tens or forty?

Express fifty; sixty; seventy; eighty; ninety; ten tens or one hundred.

Point to a number that has just two tens in it; that has three tens in it; that has six tens in it; that has five tens in it; that has seven tens in it; that has eight tens in it.

Point to the column of tens. Which number has the least number of tens? which number has the greatest number of tens?

Express on the board the sum of ten and ten.

How many fingers and toes have you, counted together?

If it is ten miles from here to Boston, how far is it to Boston and back?

Express on the board the sum of twenty and ten.

A twenty-dollar bill and a ten-dollar bill are how much money?

If we own twenty hens and ten ducks, how many fowls do we own?

If I am twenty years old, and you are ten years old, what is the sum of our ages?

Express the sum of thirty and ten.

If you have thirty cents, and I give you a ten-cent piece, how much money will you have?

If you read thirty minutes, and write ten minutes, how long a time is required for reading and writing?

Express the sum of forty and ten.

If a barrel holds forty gallons of vinegar, and a cask holds ten gallons, how much will both hold together?

A train ran forty miles the first hour, but, owing to a break in the engine, it ran but ten miles the next hour. How far did the train run in the two hours?

A small broom cost forty cents, and a dust-pan ten cents.

How much did both cost? What part of a dollar is fifty cents?

If I have half a dollar, and you have ten cents, how much money have we together?

If I buy a half-dollar's worth of postage stamps, and ten postal cards at a cent each, how much money do I spend for both?

Express the sum of fifty and ten.

Express the sum of sixty and ten.

If you have sixty cents in your bank, and your father puts in two five-cent pieces, how much money will there be in your bank?

If a gallon of molasses costs sixty cents, and a pound of sugar costs ten cents, how much do both cost?

Express the sum of seventy and ten.

I bought a half-bushel of peaches for seventy cents, and a half-dozen pears for ten cents. How much did I pay for both?

My winter cloak cost seventy dollars, and my hat ten dollars. How much did both together cost?

Express the sum of eighty and ten.

A man had ten hens and eighty chickens. How many hens and chickens had he together?

A man bought a chamber-set for eighty dollars, and a lamp for ten dollars. How much did he pay for both?

Express the sum of ninety and ten.

If you have nine ten-cent pieces, and I give you another ten-cent piece, how much money will you have?

If there were ninety cans on one shelf, and ten on another shelf, how many cans were on both shelves together?

If I buy ninety pounds of fine flour, and ten pounds of Graham flour, how many pounds of flour shall I buy?

We own a clock that is ninety years old. How old will it be in ten years from this time?

I have a piece of money that was coined ninety years ago. How old will it be ten years from now?

Express twenty on the board. Express thirty below it. Two tens and three tens are how many tens? Draw a line, and express the answer. Find the sum of thirty and forty by adding the tens. Find the sum of fifty and forty in the same way. Find the sum of fifty and twenty; of sixty and thirty; of forty and forty; of fifty and fifty; of seventy and twenty; of sixty and twenty; of twenty and thirty; of thirty and thirty; of thirty and fifty; of twenty and forty; of twenty and twenty.

There are twenty quires of paper in a ream. How many quires of paper are there in two reams? in three reams? in four reams? in five reams?

Twenty years is called a *score* of years. How old is a man who is two score years? How old is a man who is four score years?

How many pennies have I if I have half a score of pennies? How many errands has a boy to do if he has half a score of errands to do?

How many children were playing in the school-yard if there were three score of children?

How many weeks are there in two terms of twenty weeks each?

Five twenty-dollar gold pieces are how much money?

Express two times twenty thus: $\begin{array}{r} 20 \\ \times\ 2 \\ \hline \end{array}$

Express in a similar way: Three times twenty; four times twenty; five times twenty; twenty times two; twenty times three; twenty times four; twenty times five.

How many days are there in two months of thirty days each?

How many yards of carpeting will be required for three rooms, if each room takes thirty yards?

If a man who is now forty years old lives to be twice as old as he is now, how old will he be?

If I teach school forty weeks a year, how many weeks shall I teach in two years?

If you owe me two half-dollars, how many cents do you owe me?

If cloth is fifty cents a yard, how much will two yards cost?

What will two boxes of paper cost at fifty cents a box?

Express: Two times thirty; three times thirty; two times forty; two times fifty; thirty times two; thirty times three; forty times two; fifty times two.

Take this number work:

$20+10=$	$60+10=$	$3\times10=$	$7\times10=$
$30+10=$	$70+10=$	$2\times10=$	$6\times10=$
$40+10=$	$80+10=$	$5\times10=$	$9\times10=$
$50+10=$	$90+10=$	$4\times10=$	$8\times10=$

30	50	40	60
+40	+20	+40	+20
30	20	50	60
+30	+40	+40	+30
50	20	30	70
+50	+30	+50	+20

20	20	20	20	30	30	40
2	3	4	5	2	3	2

I am twenty years old. How old was I ten years ago?

It is now the thirtieth of the month. What day of the month was it ten days ago?

A small peach-tree bore fifty peaches. Ten peaches dropped off before they were ripe. How many peaches stayed on the tree to ripen?

A man had seventy silk circulars in the morning, but sold ten during the day. How many had he left?

A ninety-cent book was sold to me for ten cents under price. How much did I pay for the book?

I gave a dollar bill in payment for some work done at the jeweller's, and received ten cents in change. How much did I pay for the work?

In a flight of stairs there are forty steps. There are ten steps from the floor to the first landing. How many steps from the first landing to the top?

I was away for a visit of sixty days. If I spent ten days in going and returning, how many days had I for my visit?

A church in our town was built eighty years ago. A large white house that stands near it was built ten years afterwards. How many years has the house been built?

Express fifty on the board. Express beneath it thirty. Five tens minus three tens are how many tens? Draw a line and express the answer. Find the difference between fifty and twenty by subtracting the tens. Find the difference between fifty and forty; between fifty and ten; between seventy and thirty; between seventy and twenty; between seventy and fifty; between seventy and forty; between seventy and sixty; between seventy and ten; between sixty and twenty; between sixty and forty; between sixty and ten; between sixty and thirty; between sixty and fifty; between forty and ten; between forty and thirty; between forty and twenty; between eighty and thirty; between eighty and forty; between eighty and

ten; between eighty and twenty; between eighty and fifty; between eighty and seventy; between ninety and thirty; between ninety and sixty; between ninety and twenty; between ninety and seventy.

How many quarts of berries, at ten cents a quart, can be bought for thirty cents? for fifty cents? for seventy cents? for ninety cents?

If there are twenty quires of paper in a ream, how many reams are there in forty quires? in sixty quires? in eighty quires?

If twenty things make a score, how many scores are there in forty? in one hundred?

If thirty days are counted to a month, how many months will sixty days equal? will ninety days equal?

For eighty cents, how many pictures can I have framed at forty cents apiece?

One hundred is how many times twenty? is how many times fifty?

Ninety is how many times thirty?

Sixty is how many times thirty? is how many times twenty?

Eighty is how many times twenty; is how many times forty?

Take this number work:

$20 - 10 =$	$20 \div 10 =$	$20 \div 2 =$	$10 \times 4 =$
$30 - 10 =$	$30 \div 10 =$	$50 \div 5 =$	$10 \times 2 =$
$40 - 10 =$	$60 \div 10 =$	$70 \div 7 =$	$10 \times 3 =$
$50 - 10 =$	$40 \div 10 =$	$30 \div 3 =$	$10 \times 5 =$
$60 - 10 =$	$70 \div 10 =$	$40 \div 4 =$	$10 \times 7 =$
$70 - 10 =$	$50 \div 10 =$	$60 \div 6 =$	$10 \times 9 =$
$80 - 10 =$	$80 \div 10 =$	$80 \div 8 =$	$10 \times 8 =$
$90 - 10 =$	$100 \div 10 =$	$100 \div 10 =$	$10 \times 10 =$

90	90	90	90	90	90
−30	−50	−70	−60	−40	−20
80	80	80	80	80	80
−30	−50	−70	−60	−40	−20
70	70	70	70	70	70
−30	−50	−20	−40	−60	−30

If you have two ten-cent pieces and a cent, how much money have you? If your cent were a two-cent piece, how much money would you have? If you had a three-cent piece instead of a one-cent piece, how much money would you have? Suppose you had two two-cent pieces, and the twenty cents, how much money would you have? If you had a five-cent piece and twenty cents, how much money would you have? What part of a dollar would you have? How many cents are twenty cents and two three-cent pieces? twenty cents and three two-cent pieces? twenty cents, a five-cent piece, and a two-cent piece? twenty cents, a five-cent piece, and a three-cent piece? twenty cents and three three-cent pieces?

Express the sum of:

Twenty and one.	Twenty and five.
Twenty and two.	Twenty and seven.
Twenty and six.	Twenty and nine.
Twenty and three.	Twenty and eight.

If twenty and one are twenty-one, how much are thirty and one?

Express:

Thirty and one.	Forty and one.
Thirty and four.	Forty and four.
Thirty and six.	Forty and six.
Thirty and eight.	Forty and eight.
Thirty and five.	Forty and five.
Thirty and nine.	Forty and nine.
Thirty and two.	Forty and two.
Fifty and one.	Sixty and one.
Fifty and two.	Sixty and two.
Fifty and five.	Sixty and six.

In twenty-four how many tens? how many ones besides? In thirty-five how many tens and how many ones besides? in fifty-seven? in sixty-three? in seventy-four? in eighty-nine? in ninety-six? in seventeen? in fifteen? in nineteen?

Write in a column: Thirty-seven; forty-one; sixty-three; eighty-five; fifty-four; seventy-seven. Show me the column of ones; the column of tens. Which number has the most tens?

Copy and complete:

$20+3=$	$10+2=$	$12-2=$	$7+10=$
$20+5=$	$20+2=$	$22-2=$	$17+10=$
$20+7=$	$30+2=$	$32-2=$	$27+10=$
$20+9=$	$40+2=$	$42-2=$	$37+10=$
$30+4=$	$50+2=$	$52-2=$	$47+10=$
$30+7=$	$60+2=$	$62-2=$	$57+10=$
$30+2=$	$70+2=$	$72-2=$	$67+10=$
$40+1=$	$80+2=$	$82-2=$	$77+10=$
$40+8=$	$90+2=$	$92-2=$	$87+10=$
$50+4=$	$10+7=$	$14-4=$	$97-10=$

CHAPTER XXI.

THE NUMBER TWENTY.

§ 43. The Number Twenty.

Take twenty. How many tens have you taken?

Two tens are how many. Express this fact on the board?

Show me one-half of twenty. What is one-half of twenty? Express: One-half of twenty is ten.

If there are twenty pencils on my desk, and half are lead-pencils and half are slate-pencils, how many pencils of each kind are on my desk?

If there are twenty pins in a row, how many pins are in half of the row?

I am twenty years old. Who knows some little girl who is half as old as I am? How old is she?

Our school term is twenty weeks long. If we have a vacation when half the term is over, how many weeks after the beginning of the term does vacation come?

Who can express: Twenty divided by ten?

Give me an example for twenty divided by ten.

Express on the board: Ten and ten are twenty. What two equal numbers make ten? Write: Five and five under each ten. Read: Ten and ten are twenty, in fives. (Five and five and five and five are twenty.) How many fives are twenty? Express: Four fives are twenty.

Four five-cent pieces are how much money?

Four gloves have how many fingers?

A dog has how many toes?

Four pansy blossoms have how many petals?

Four five-cent bunches of envelopes will cost how much?

Into how many fives can twenty be divided? Express this fact.

Give an example for: Twenty divided by five.

What four equal numbers make twenty?

What part of twenty is each of these numbers?

What part of twenty is five?

Express: One-fourth of twenty is five.

I had twenty quires of paper done up in four equal packages. How many quires were in each package?

A little girl who had two dimes spent a fourth of her money for fancy crackers. How much money did she spend?

If I am twenty years old, how old is a little girl who is only one-fourth of my age?

Copy and complete:

$2 \times 10 =$	$20 \div 5 =$	$\times 5 = 20$	$\div 10 = 2$
$20 \div 10 =$	$\frac{1}{4}$ of $20 =$	$\div 5 = 4$	$9 \times \quad = 18$
$\frac{1}{2}$ of $20 =$	$10 + 10 =$	of $20 = 10$	$6 \times \quad = 18$
$4 \times 5 =$	$15 + 5 =$	of $20 = 5$	$5 \times \quad = 15$

20	18	16	14	19	17	18	20
-10	-9	-8	-7	-13	-12	-15	-15

3	4	6	3
2	3	5	4
5	2	3	5
4	3	2	2
3	6	4	6
—	—	—	—

Who knows how many fours there are in twenty? Those who do not know must find out with the splints.

Express: Twenty divided by four are five.

How many barges will twenty horses supply if four are required for each barge?

Twenty horse-shoes will shoe how many horses all round?

How many quarts of milk can be bought for twenty cents if each quart costs four cents?

Twenty quarts are how many gallons?

Twenty gills are how many pints?

If you find five fours in twenty, how many fours must you put together to make twenty?

Express: Five fours are twenty.

How many wheels have five wagons?

How many legs have five chairs?

How many sides have five squares?

Five gallons are how many quarts?

Five pints are how many gills?

Five horses wear how many shoes?

How many twos in ten? How many twos in two tens? How many twos in twenty, then?

Express: Twenty divided by two are ten.

If you have twenty cents in two-cent pieces, how many two-cent pieces have you?

Twenty pints are how many quarts?

Twenty half-dollar pieces make how many dollars?

Twenty slate-pencils will cost how much if two can be bought for a cent? Twenty apples will cost how much at the same rate?

How many dozen buttons, at two cents a dozen, can be bought for twenty cents?

If in twenty you find ten twos, how many twos will you take to make twenty?

Ten two-cent pieces are how much money?

Ten boys have how many ears?

Ten boys wear how many shoes? how many mittens?

How much does it cost to send ten letters through the mail, if it costs two cents for each letter?

Ten quarts are how many pints?

Ten dollars are how many half-dollars?

Illustrate these examples, and tell me the answer:

A basket-maker put two handles on each basket. How many handles did he put on ten baskets?

I have two boxes, both the same size. They are three inches in length and two in width. How many inches of gilt paper will it take to bind both boxes around the edge?

I made five gallons of preserves, and put the preserves into quart jars. How many jars did I use?

I have a square garden plot bordered with foliage plants. If there are four on each side, one standing at each corner, how many plants are around the plot?

Make a triangle with dots, putting a dot on each corner, and having three dots on each side. How many dots have you made? Make believe these are trees arranged to form an arbor. How many trees does it take to form a triangle if there are three on each side?

How many trees will it take to form a square, if there are five trees on each side? if there are six trees on each side?

Take this number work:

$20 \div 4 =$	$16 + 4 =$	$\frac{1}{4}$ of $20 =$
$5 \times 4 =$	$15 + 5 =$	$5 \times \quad = 20$
$20 \div 2 =$	$18 + 2 =$	$4 \times \quad = 20$
$10 \times 2 =$	$\frac{1}{2}$ of $20 =$	$10 \times \quad = 20$

$2 \times \quad = 20$	$20 \div \quad = 1$	$+ \ 5 = 20$
$20 \div \quad = 5$	$\times \ 5 = 20$	$+ \ 4 = 20$
$20 \div \quad = 4$	$\times \ 4 = 20$	$+ 10 = 20$
$20 \div \quad = 2$	$\times 10 = 20$	$+ \ 2 = 20$
$20 \div \quad = 10$	$\times \ 2 = 20$	$\text{of } 20 = \ 5$

10	10	10	10	10	10
2	3	4	5	6	7
—	—	—	—	—	—
10	10	10	20	20	20
8	9	10	1	2	3
—	—	—	—	—	—
20	20	30	30	40	50
4	5	2	3	2	2
—	—	—	—	—	—
10	20	30	40	50	60
−3	−3	−3	−3	−3	−3
—	—	—	—	—	—
10	20	30	40	50	60
−7	−7	−7	−7	−7	−7
—	—	—	—	—	—

Add:

5	6	7	6	9	8	6	12	6	8
4	3	5	8	4	7	5	8	12	9
—	—	—	—	—	—	—	—	—	—